

APPENDIX A

ENGINEERING APPENDIX

ATTACHMENT B

Plates, Core Boring Logs, Laboratory Reports, Jetty Stability Analysis

PART 2





Jacksonville Harbor Navigation Study, Duval County,
Florida

DRAFT
INTEGRATED GENERAL REEVALUATION
REPORT II AND SUPPLEMENTAL
ENVIRONMENTAL IMPACT STATEMENT

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS												
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW												
LOCATION COORDINATES X = 487,318 Y = 2,201,495			ELEVATION TOP OF BORING -43.0 Ft.															
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE									
-63.0	20.0	Slightly Weathered	moderately hard, slightly weathered, fine grained, pitted, sand filled pits, moist, 5Y 7/2 light gray At El. -61.0 Ft., solid	90	RUN # 1	RQD 65	4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 300 psi DFR = 25 %											
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Set 50.5 ft. of 6" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Dames Point Bridge. 5. Water depth of -43.8 ft. recorded at 08:15 AM on 1/24/2010. Tide gage reading of +0.8 ft. mllw 6. Compressive Strength Test of Rock Core At Elevation -58.8' to -59.5" = 340 PSI. 7. Additional lab test results were added February 2011 8. Laboratory Testing Results <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.0/1.5</td> <td>SP* -</td> </tr> <tr> <td>3</td> <td>3.0/4.5</td> <td>MH* -</td> </tr> </tbody> </table> *Lab visual classification based on gradation curve. No Atterberg limits.	SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION	1	0.0/1.5	SP* -	3	3.0/4.5	MH* -				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.). Abbreviations: DT = Drill Time. HP = Hydraulic Pressure. DFR = Drill Fluid Return.		
SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION																
1	0.0/1.5	SP* -																
3	3.0/4.5	MH* -																

Boring Designation CB-JHPM09-10

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District			SHEET 1 OF 3 SHEETS		
1. PROJECT Jacksonville Harbor GRR EAST MILL COVE WIDENER				9. SIZE AND TYPE OF BIT See Remarks					
2. BORING DESIGNATION CB-JHPM09-10		LOCATION COORDINATES X = 486,647 Y = 2,200,722		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW		
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER			
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES		DISTURBED 28	UNDISTURBED (UD) 0		
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES		2			
6. THICKNESS OF OVERBURDEN N/A				14. ELEVATION GROUND WATER		TIDAL			
7. DEPTH DRILLED INTO ROCK N/A				15. DATE BORING		STARTED 01-21-10	COMPLETED 01-21-10		
8. TOTAL DEPTH OF BORING 42.0 Ft.				16. ELEVATION TOP OF BORING		-18.9 Ft.			
				17. TOTAL RECOVERY FOR BORING		84 %			
				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer					
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-18.9	0.0		SAND, silty, mostly angular to subangular fine-grained sand-sized quartz, little silt, wet, 5Y 4/2 olive gray (SM)	53	1		-18.9	0	0
-20.4	1.5		SILT, organic-L, nonplastic, very soft, trace angular to subangular fine-grained sand-sized quartz, wet, 5Y 4/2 olive gray (OL)	100	2		-20.4	0	0
				67	3		-21.9	0	0
				40	4		-23.4	0	5
			At El. -24.9 Ft., moist	80	5		-24.9	0	0
			At El. -26.4 Ft., low plasticity, trace angular shell up to 3/8", organic odor	67	6		-26.4	0	0
			At El. -27.9 Ft., soft	100	7		-27.9	0	10
				100	8		-29.4	1	2
			At El. -30.9 Ft., discontinue shell	100	9		-30.9	1	2
			At El. -32.4 Ft., medium plasticity, trace angular shell up to 1/8"	100	10		-32.4	1	2
							-33.9	0	0

DRILLING LOG (Cont. Sheet)				INSTALLATION Jacksonville District			SHEET 2 OF 3 SHEETS				
PROJECT Jacksonville Harbor GRR				COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW				
LOCATION COORDINATES X = 486,647 Y = 2,200,722				ELEVATION TOP OF BORING -18.9 Ft.							
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 Ft.	N-VALUE		
			SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, trace angular to subangular shell up to 1/8", moist, 5Y 4/1 dark gray (SM) SILT, organic-L, low plasticity, soft, trace organic matter, moist, 5Y 4/1 dark gray (OL) At El. -39.9 Ft., few organic matter	100	11		SPT Sampler	2	3		
								-35.4		1	
										0	2
						100	12		SPT Sampler	1	
								-36.9	1		
						93	13		SPT Sampler	3	5
-38.2	19.3								2		
								-38.4	3		
-38.9	20.0					80	14		SPT Sampler	3	5
									2		
						-39.9	3				
				87	15		SPT Sampler	1	3		
								-41.4		2	
										2	3
						100	16		SPT Sampler	1	
								-42.9	2		
						100	17		SPT Sampler	0	5
									2		
								-44.4	3		
						100	18		SPT Sampler	2	8
									3		
						-45.9	5				
-46.2	27.3							3	7		
-46.7	27.8		CLAY, lean, low plasticity, soft, moist, 5GY 4/1 dark greenish gray (CL)	87	19		SPT Sampler	2			
			LIMESTONE, sandy, sparsely fossiliferous, very soft, highly weathered, moist, 5Y 6/1 gray				5				
			At El. -48.9 Ft., massive bedding, bedding orientation	73	20		SPT Sampler	11	50		
										8	
								-48.9		42	
						87	21		SPT Sampler	25	27
									16		
								-50.4	11		
						73	22		SPT Sampler	11	21
									17		
								-51.9	4		
						73	23		SPT Sampler	9	18
							9				
						-53.4	9				
			At El. -53.4 Ft., moderately hard	100	24		SPT Sampler	50			
							-53.9				

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 3 OF 3 SHEETS												
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW												
LOCATION COORDINATES X = 486,647 Y = 2,200,722			ELEVATION TOP OF BORING -18.9 Ft.															
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE									
-60.9	42.0		At El. -56.4 Ft., soft At El. -57.9 Ft., 5Y 7/2 light gray	67	25		Advanced Boring											
							-54.9											
							-55.2	SPT Sampler	50/0.3'									
							-56.4	Advanced Boring										
						67	26		SPT Sampler	9 4 3	7							
						80	27		SPT Sampler	2 3 7	10							
				80	28		SPT Sampler	9 28 50	78									
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Set 35.5 ft. of 6" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Blount Island Terminal. 5. Water depth of -19.6 ft. recorded at 08:25 AM on 1/21/2010. Tide gage reading of +0.7 ft. mllw 6. Additional lab test results were added February 2011 7. Laboratory Testing Results <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>12</td> <td>16.5/18.0</td> <td>MH*</td> </tr> <tr> <td>15</td> <td>21.0/22.5</td> <td>MH*</td> </tr> </tbody> </table> *Lab visual classification based on gradation curve. No Atterberg limits.	SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION	12	16.5/18.0	MH*	15	21.0/22.5	MH*				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		
SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION																
12	16.5/18.0	MH*																
15	21.0/22.5	MH*																

Boring Designation CB-JHPM09-11

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 2 SHEETS	
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks			
				10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	
2. BORING DESIGNATION CB-JHPM09-11		LOCATION COORDINATES X = 488,659 Y = 2,201,799		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig			
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		12. TOTAL SAMPLES 11		DISTURBED 0	
4. NAME OF DRILLER Marvin Strickland				13. TOTAL NUMBER CORE BOXES 0			
				14. ELEVATION GROUND WATER TIDAL			
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL		BEARING		15. DATE BORING 01-20-10	
6. THICKNESS OF OVERBURDEN N/A				16. ELEVATION TOP OF BORING -45.1 Ft.		COMPLETED 01-20-10	
7. DEPTH DRILLED INTO ROCK N/A				17. TOTAL RECOVERY FOR BORING 75 %			
8. TOTAL DEPTH OF BORING 19.8 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer			

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD COR D	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-45.1	0.0						-45.1		
-45.3	0.2		SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, few angular to subangular shell up to 1-1/2", wet, 5Y 4/3 olive (SM)	73	1		SPT Sampler	9 8	15
-46.6			SAND, poorly-graded with silt, mostly angular to subangular fine to medium-grained sand-sized quartz, little angular to subangular shell up to 3/8", few silt, wet, 5Y 5/1 gray (SP-SM)	67	2		SPT Sampler	7 4 3	9
-47.1	2.0		LIMESTONE, very soft, highly weathered, fine grained, 5Y 7/4 pale yellow				-48.1	6	
-48.4	3.3		CLAY, fat, medium plasticity, hard, dry, 5BG 5/1 greenish gray (CH) At El. -49.1 Ft., 5Y 7/1 light gray	93	3		SPT Sampler	8 7	30
-50.1	5.0		At El. -49.9 Ft., some angular to subangular fine to medium-grained sand-sized quartz	93	4		SPT Sampler	23 7 47	5
			LIMESTONE, sparsely fossiliferous, soft, highly weathered, fine grained, moist, 5Y 8/2 pale yellow	67	5		SPT Sampler	31 20 25	78
-53.4	8.3		At El. -52.6 Ft., moderately hard, slightly weathered	100	6		SPT Sampler	30 37	55
-54.1	9.0		LIMESTONE, sandy, non-fossiliferous, very soft				-53.4	50/0.3'	
			LIMESTONE, sparsely fossiliferous, hard, slightly weathered, thick bedding, bedding orientation, porous	58	RUN RQD # 1	25	4 x 5-1/2" Diamond Impregnated Bit DT = 4 mins HP = 300 psi DFR = 25 %		10
-57.1	12.0		LIMESTONE, soft, highly weathered				-58.9		
				53	7		SPT Sampler	6 7	14

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS			
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW			
LOCATION COORDINATES X = 488,659 Y = 2,201,799			ELEVATION TOP OF BORING -45.1 Ft.						
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-64.9	19.8	Highly Weathered ↑ Slightly Weathered ↓	At El. -60.4 Ft., very soft	53	7		-60.4 SPT Sampler	7	15
				100	8		SPT Sampler	12	30
			At El. -61.9 Ft., moderately hard, slightly weathered	100	9		-61.9 SPT Sampler	18	
							-62.2 SPT Sampler	50/0.3'	
							Advanced Boring		
							-63.4		
				100	10		SPT Sampler	6	23
							-64.9	11	
								12	
			NOTES:				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		20
			1. USACE Jacksonville is the custodian for these original files.				Abbreviations:		
			2. Soils are field visually classified in accordance with the Unified Soils Classification System.				DT = Drill Time.		
			3. Set 55.5 ft. of 6" flush joint steel casing				HP = Hydraulic Pressure.		
			4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Blount Island Terminal.				DFR = Drill Fluid Return.		
			5. Water depth of -47.2 ft. recorded at 10:41 AM on 1/20/2010. Tide gage reading of +2.1 ft. mllw						25
			6. Compressive Strength Test of Rock Core At Elevation -54.6' to -55.1' = 815 PSI.						
			7. Laboratory Testing Results						
			SAMPLE ID SAMPLE DEPTH LABORATORY CLASSIFICATION						
			1 0.0/1.5 SP-SM*						
			*Lab visual classification based on gradation curve. No Atterberg limits.						30

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL			9. SIZE AND TYPE OF BIT See Remarks	
2. BORING DESIGNATION CB-JHPM09-12		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		VERTICAL MLLW
4. NAME OF DRILLER Marvin Strickland		12. TOTAL SAMPLES 14		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		13. TOTAL NUMBER CORE BOXES 1		UNDISTURBED (UD) 0
6. THICKNESS OF OVERBURDEN N/A		14. ELEVATION GROUND WATER TIDAL		
7. DEPTH DRILLED INTO ROCK N/A		15. DATE BORING 01-20-10		COMPLETED 01-20-10
8. TOTAL DEPTH OF BORING 19.9 Ft.		16. ELEVATION TOP OF BORING -44.0 Ft.		
		17. TOTAL RECOVERY FOR BORING 87 %		
		18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RCD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
-44.0	0.0		SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, few angular to subangular shell up to 3/4", wet, 5Y 4/4 olive (SM)	67	1		-44.0	0	0
							SPT Sampler	2	5
							-45.5	3	
			At El. -46.0 Ft., moist	100	2		SPT Sampler	4	10
							-47.0	5	
			At El. -47.0 Ft., few angular to subangular shell up to 1"	100	3		SPT Sampler	5	13
							-48.5	8	
			At El. -48.5 Ft., discontinue shell	80	4		SPT Sampler	2	5
							-50.0	3	7
								4	
							SPT Sampler	5	16
							-51.5	7	
			At El. -51.5 Ft., 5Y 3/2 dark olive gray	67	6		SPT Sampler	9	14
							-53.0	5	
			At El. -53.0 Ft., 10Y 2.5/1 greenish black	100	7		SPT Sampler	7	5
							-54.5	2	10
								3	
							SPT Sampler	5	22
							-56.0	11	
								11	
							SPT Sampler	6	24
							-57.5	12	
								12	
							SPT Sampler	14	
							-59.0	16	39
								23	
-58.5	14.5		LIMESTONE, sandy, sparsely fossiliferous,	93	10				

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS			
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW			
LOCATION COORDINATES X = 490,672 Y = 2,201,783			ELEVATION TOP OF BORING -44.0 Ft.						
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-62.0	18.0	SI. Weathered Highly Weath.	soft, highly weathered, porous, moist, 5Y 6/3 pale olive At El. -60.5 Ft., moderately hard, slightly weathered	80	11		SPT Sampler	21 13 10	23
				75	12		-60.5 - -60.9 SPT Sampler	50/0.4'	
							Advanced Boring		
							-62.0		
-63.9	19.9		SILT, inorganic-H, nonplastic, very hard, dry, 5Y 6/3 pale olive (MH)	93	13		SPT Sampler	26 14 17	31
				75	14		-63.5 -63.9 SPT Sampler	50/0.4'	
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Set 55.5 ft. of 6" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Blount Island Terminal. 5. Water depth of -45.2 ft. recorded at 08:08 AM on 1/20/2010. Tide gage reading of +1.2 ft. mllw 6. Laboratory Testing Results SAMPLE ID SAMPLE DEPTH LABORATORY CLASSIFICATION 2 1.5/3.0 SM* *Lab visual classification based on gradation curve. No Atterberg limits.				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL			9. SIZE AND TYPE OF BIT See Remarks	
2. BORING DESIGNATION CB-JHPM09-13		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		VERTICAL MLLW
4. NAME OF DRILLER Marvin Strickland		12. TOTAL SAMPLES 10		UNDISTURBED (UD) 0
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		13. TOTAL NUMBER CORE BOXES 1		14. ELEVATION GROUND WATER TIDAL
6. THICKNESS OF OVERBURDEN N/A		15. DATE BORING 01-19-10		COMPLETED 01-19-10
7. DEPTH DRILLED INTO ROCK N/A		16. ELEVATION TOP OF BORING -49.7 Ft.		17. TOTAL RECOVERY FOR BORING 83 %
8. TOTAL DEPTH OF BORING 15.0 Ft.		18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer		

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
-49.7	0.0		SAND, poorly-graded, mostly angular to subangular fine to medium-grained sand-sized quartz, little angular to subangular shell up to 3/8", wet, 5Y 5/3 olive (SP)	80	1		-49.7	6	0
							SPT Sampler	8	17
							-51.2	9	
-52.0	2.3		SAND, poorly-graded with silt, mostly angular to subangular fine-grained sand-sized quartz, few silt, few angular to subangular shell up to 1/8", wet, 5Y 5/1 gray (SP-SM)	100	2			9	21
-52.7	3.0						-52.7	11	
								10	
			SAND, silty, mostly angular to subangular fine-grained sand-sized quartz, some angular to subangular shell up to 3/4", little silt, wet, 5Y 4/1 dark gray (SM)	93	3			4	13
							-54.2	6	
								7	
				67	4		SPT Sampler	8	5
							-55.7	9	18
								9	
				73	5		SPT Sampler	4	10
							-57.2	4	
								6	
				87	6		SPT Sampler	9	19
							-58.7	10	
								9	
				100	7		SPT Sampler	2	5
							-60.2	2	10
								3	
				73	8		SPT Sampler	9	
-61.7	12.0		At El. -61.2 Ft., strong cementation, 2.5Y 4/4 olive brown				-61.7	8	58
			SILT, inorganic-L, medium plasticity, hard, moist, 2.5Y 4/4 olive brown (ML)	89	9			50	
							-62.6	23	
-63.2	13.5		At El. -62.7 Ft., very hard				-63.2	50/0.4'	
							Advanced Boring		
			SAND, silty, mostly medium to coarse-grained sand-sized quartz, little silt, moist, 5Y 6/4 pale olive (SM)	73	10			31	
							SPT Sampler	10	24
-64.7	15.0						-64.7	14	

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS									
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW									
LOCATION COORDINATES X = 492,489 Y = 2,202,538			ELEVATION TOP OF BORING -49.7 Ft.												
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE						
			<p>NOTES:</p> <ol style="list-style-type: none"> USACE Jacksonville is the custodian for these original files. Soils are field visually classified in accordance with the Unified Soils Classification System. Set 59.5 ft. of 6" flush joint steel casing Water depth recorded at start of drilling operations and referenced to the tidal station at the Blount Island Terminal. Water depth of -51.4 ft. recorded at 08:38 AM on 1/19/2010. Tide gage reading of +1.7 ft. mllw Laboratory Testing Results <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.0/1.5</td> <td>SP*</td> </tr> </tbody> </table> <p>*Lab visual classification based on gradation curve. No Atterberg limits.</p>	SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION	1	0.0/1.5	SP*				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		
SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION													
1	0.0/1.5	SP*													

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 2 SHEETS			
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks					
2. BORING DESIGNATION CB-JHPM09-14		LOCATION COORDINATES X = 494,732 Y = 2,202,376		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83			
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER			
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES		DISTURBED 13			
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD) 0			
6. THICKNESS OF OVERBURDEN N/A				14. ELEVATION GROUND WATER		TIDAL			
7. DEPTH DRILLED INTO ROCK N/A				15. DATE BORING		STARTED 01-15-10			
8. TOTAL DEPTH OF BORING 18.9 Ft.				16. ELEVATION TOP OF BORING		COMPLETED 01-15-10			
				17. TOTAL RECOVERY FOR BORING		85 %			
				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer					
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-42.4	0.0		SAND, silty, mostly angular to subangular fine-grained sand-sized quartz, little silt, wet, 5Y 3/2 dark olive gray (SM)	60	1		-42.4	0	0
-43.9	1.5		SAND, poorly-graded, mostly angular to subangular fine to medium-grained sand-sized quartz, trace angular to subangular shell up to 1/4", wet, 5Y 6/2 light olive gray (SP)	80	2		-43.9	3	10
-46.9	4.5		At El. -46.2 Ft., 5Y 4/1 dark gray	87	3		-45.4	2	0
-48.4	6.0		CLAY, lean, low plasticity, firm, few angular shell up to 2", trace angular to subangular fine-grained sand-sized quartz, moist, 5Y 7/2 light gray (CL)	80	4		-46.9	2	5
-49.9	7.5		SAND, clayey, nonplastic, hard, mostly fine-grained sand-sized quartz, little angular shell up to 2", little clay, moist, 5Y 7/2 light gray (SC)	80	5		-48.4	3	13
			LIMESTONE, sandy, sparsely fossiliferous, very soft, slightly weathered, fine grained, thick bedding, bedding orientation, moist, 2.5Y 8/2 pale yellow	80	6		-49.9	7	55
				73	7		-51.4	15	22
				87	8		-52.9	23	17
				100	9		-54.4	32	21
				100	10		-55.9	8	21
							-57.4	10	17

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS															
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW															
LOCATION COORDINATES X = 494,732 Y = 2,202,376			ELEVATION TOP OF BORING -42.4 Ft.																		
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE												
-58.9	16.5			100	11		SPT Sampler	6 21 32	53												
			SAND, poorly-graded, mostly angular to subangular fine to medium-grained sand-sized quartz, trace angular shell up to 1/8", trace subrounded phosphate up to 1/8", moist, 5Y 8/1 white (SP)	93	12		SPT Sampler	9 31 50/0.4'	81+												
-61.3	18.9			89	13		Advanced Boring SPT Sampler	18 50/0.4'													
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Set 54.5 ft. of 6" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Blount Island Terminal. 5. Water depth of -45.6 ft. recorded at 08:14 AM on 1/15/2010. Tide gage reading of +3.2 ft. mllw 6. Additional lab test results were added February 2011 7. Laboratory Testing Results <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.0/1.5</td> <td>SP*</td> </tr> <tr> <td>3</td> <td>3.0/4.5</td> <td>SP*</td> </tr> <tr> <td>4</td> <td>4.5/6.0</td> <td>ML*</td> </tr> </tbody> </table> *Lab visual classification based on gradation curve. No Atterberg limits.	SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION	1	0.0/1.5	SP*	3	3.0/4.5	SP*	4	4.5/6.0	ML*				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		
SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION																			
1	0.0/1.5	SP*																			
3	3.0/4.5	SP*																			
4	4.5/6.0	ML*																			

Boring Designation CB-JHPM09-15

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 3 SHEETS			
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks					
2. BORING DESIGNATION CB-JHPM09-15		LOCATION COORDINATES X = 497,199 Y = 2,203,050		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83			
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER			
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES 21		UNDISTURBED (UD) 0			
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES 1		14. ELEVATION GROUND WATER TIDAL			
6. THICKNESS OF OVERBURDEN N/A				15. DATE BORING 01-14-10		COMPLETED 01-14-10			
7. DEPTH DRILLED INTO ROCK N/A				16. ELEVATION TOP OF BORING -31.1 Ft.		17. TOTAL RECOVERY FOR BORING 80 %			
8. TOTAL DEPTH OF BORING 31.5 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer					
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-31.1	0.0		SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, few angular to subangular shell up to 1-1/2", wet, 5Y 5/2 olive gray (SM)	60	1		-31.1	1	0
-32.6	1.5		SAND, poorly-graded, mostly angular to subangular medium to coarse-grained sand-sized quartz, little angular shell up to 1/8", wet, 5Y 5/3 olive (SP)	73	2		-32.6	3	5
-34.1	3.0		SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, trace angular to subangular shell up to 1/4", wet, strongly cemented 2" nodule, 5Y 5/2 olive gray (SM)	53	3		-34.1	4	2
			At El. -37.1 Ft., little angular shell up to 3/8"	60	4		-35.6	5	12
-38.6	7.5			67	5		-37.1	6	5
-40.1	9.0		SAND, poorly-graded with silt, mostly angular to subangular coarse-grained sand-sized quartz, little angular shell up to 3/8", few silt, wet, 5Y 4/2 olive gray (SP-SM)	67	6		-38.6	7	9
			At El. -39.6 Ft., trace angular shell up to 1/8"	67	7		-40.1	8	4
-43.1	12.0		SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, trace angular to subangular shell up to 1/8", wet, 5Y 4/2 olive gray (SM)	67	8		-41.6	9	3
			At El. -41.6 Ft., 5Y 3/2 dark olive gray	80	9		-43.1	10	10
-44.6	13.5		SAND, poorly-graded, mostly angular to subangular fine to medium-grained sand-sized quartz, trace angular shell up to 1/8", wet, 5Y 5/1 gray (SP)	60	10		-44.6	11	8
		Sl. Weathered	LIMESTONE, sandy, sparsely fossiliferous, soft, slightly weathered, fine grained, thick bedding, bedding orientation, moist, 5Y 5/1 gray	13			-46.1	12	12
								13	13

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 3 SHEETS			
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW			
LOCATION COORDINATES X = 497,199 Y = 2,203,050			ELEVATION TOP OF BORING -31.1 Ft.						
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-47.6	16.5	Sl. Weathered	At El. -46.1 Ft., moderately hard	100	11		-46.5 SPT Sampler	50/0.4'	15
							Advanced Boring		
-49.1	18.0		SAND, poorly-graded with silt, mostly angular to subangular fine to medium-grained sand-sized quartz, few subrounded limestone up to 1", moist, 5Y 6/2 light olive gray (SP-SM)	100	12		SPT Sampler	40 41 42	83
			SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, trace subangular phosphate up to 1/8", moist, 5Y 6/2 light olive gray (SM)	100	13		SPT Sampler	12 9 11	20
				100	14		SPT Sampler	11 12 12	20 24
				100	15		SPT Sampler	7 10 15	25
			At El. -53.6 Ft., 5Y 5/2 olive gray	100	16		SPT Sampler	9 12 14	26
				100	17		SPT Sampler	3 5 9	14
				100	18		SPT Sampler	8 8 15	23
				100	19		SPT Sampler	5 6 9	15
				100	20		SPT Sampler	7 8 12	20
-62.6	31.5			93	21		SPT Sampler	3 6 10	30 16
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Set 42.5 ft. of 6" flush joint steel casing				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 3 OF 3 SHEETS																		
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW																		
LOCATION COORDINATES X = 497,199 Y = 2,203,050			ELEVATION TOP OF BORING -31.1 Ft.																					
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE															
			4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Blount Island Terminal. 5. Water depth of -34.6 ft. recorded at 08:50 AM on 1/14/2010. Tide gage reading of +3.5 ft. mllw 6. Additional lab test results were added February 2011 7. Laboratory Testing Results <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.0/1.5</td> <td>SM*</td> </tr> <tr> <td>2</td> <td>1.5/3.0</td> <td>SP*</td> </tr> <tr> <td>4</td> <td>4.5/6.0</td> <td>SP-SM*</td> </tr> <tr> <td>7</td> <td>9.0/10.5</td> <td>SP*</td> </tr> </tbody> </table> *Lab visual classification based on gradation curve. No Atterberg limits.	SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION	1	0.0/1.5	SM*	2	1.5/3.0	SP*	4	4.5/6.0	SP-SM*	7	9.0/10.5	SP*						
SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION																						
1	0.0/1.5	SM*																						
2	1.5/3.0	SP*																						
4	4.5/6.0	SP-SM*																						
7	9.0/10.5	SP*																						

35

40

45

50



55


DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 2 SHEETS			
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks					
2. BORING DESIGNATION CB-JHPM09-16		LOCATION COORDINATES X = 498,983 Y = 2,202,272		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83			
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER			
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES		DISTURBED 12			
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES		0			
6. THICKNESS OF OVERBURDEN N/A				14. ELEVATION GROUND WATER		TIDAL			
7. DEPTH DRILLED INTO ROCK N/A				15. DATE BORING		STARTED 01-18-10 COMPLETED 01-18-10			
8. TOTAL DEPTH OF BORING 21.4 Ft.				16. ELEVATION TOP OF BORING		-42.9 Ft.			
				17. TOTAL RECOVERY FOR BORING		89 %			
				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer					
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
-42.9	0.0		SAND, poorly-graded, mostly angular to subangular fine to medium-grained sand-sized quartz, few angular to subangular shell up to 1/8", wet, 5Y 6/2 light olive gray (SP)	80	1		-42.9	4	0
-44.4	1.5		SAND, poorly-graded with silt, mostly angular to subangular fine to medium-grained sand-sized quartz, little angular shell up to 1/4", wet, 5Y 6/2 light olive gray (SP-SM)	100	2		-44.4	12	27
-45.4	2.5		At El. -44.9 Ft., 5Y 5/1 gray LIMESTONE, sandy, fossiliferous, moderately hard, slightly weathered, fine grained, thick bedding, bedding orientation, moist, 2.5Y 7/3 pale yellow	40	3		-45.6	9	94+
			At El. -49.3 Ft., non-fossiliferous, soft, slightly weathered, solid	83	RUN	RQD # 1	4 x 5-1/2" Diamond Impregnated Bit DT = 9 mins HP = 300 psi DFR = 10 %	44	
-52.3	9.4		SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, trace subrounded phosphate up to 1/8", moist, 5Y 7/2 light gray (SM)	100	4		-52.3	50/0.2'	
			At El. -53.9 Ft., discontinue phosphate	100	5		-46.9	10	
				87	6		-53.8	5	10
				93	7		-55.3	12	8
							-56.8	18	46
								28	
								4	7
								4	
								3	
								5	
								7	

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS								
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW								
LOCATION COORDINATES X = 498,983 Y = 2,202,272			ELEVATION TOP OF BORING -42.9 Ft.											
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE					
-64.3	21.4		At El. -59.9 Ft., 5Y 5/2 olive gray	93	7		-58.3 SPT Sampler	10	17					
								4						
				100	8		SPT Sampler	4	25					
							-59.8	21						
				100	9		SPT Sampler	10	27					
							-61.3	17						
				93	10		SPT Sampler	6						
							-62.8	7	17					
								10						
				87	11		SPT Sampler	5	20					
								12						
							-64.3	20	32					
<p>NOTES:</p> <ol style="list-style-type: none"> USACE Jacksonville is the custodian for these original files. Soils are field visually classified in accordance with the Unified Soils Classification System. Set 54.5 ft. of 4" flush joint steel casing Water depth recorded at start of drilling operations and referenced to the tidal station at the Blount Island Terminal. Water depth of -45.1 ft. recorded at 08:21 AM on 1/18/2010. Tide gage reading of +2.2 ft. mllw Compressive Strength Test of Rock Core At Elevation -48.4' to -49.1' = 1201 PSI. Compressive Strength Test of Rock Core At Elevation -49.7' to -50.1' = 135 PSI. Laboratory Testing Results <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>1.5/2.7</td> <td>SP-SM*</td> </tr> </tbody> </table> <p>*Lab visual classification based on gradation curve. No Atterberg limits.</p>			SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION	2	1.5/2.7	SP-SM*			<p>140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).</p> <p>Abbreviations: DT = Drill Time. HP = Hydraulic Pressure. DFR = Drill Fluid Return.</p>			
SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION												
2	1.5/2.7	SP-SM*												

Boring Designation CB-JHPM09-17

DRILLING LOG			DIVISION South Atlantic		INSTALLATION Jacksonville District			SHEET 1 OF 2 SHEETS	
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL					9. SIZE AND TYPE OF BIT See Remarks				
2. BORING DESIGNATION CB-JHPM09-17			LOCATION COORDINATES X = 500,552 Y = 2,201,768		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW	
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.			CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig				
4. NAME OF DRILLER Marvin Strickland					12. TOTAL SAMPLES		DISTURBED 12	UNDISTURBED (UD) 0	
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED			DEG. FROM VERTICAL		BEARING		13. TOTAL NUMBER CORE BOXES 0		
6. THICKNESS OF OVERBURDEN N/A					14. ELEVATION GROUND WATER TIDAL		15. DATE BORING		
7. DEPTH DRILLED INTO ROCK N/A					16. ELEVATION TOP OF BORING -44.4 Ft.		17. TOTAL RECOVERY FOR BORING 82 %		
8. TOTAL DEPTH OF BORING 21.5 Ft.					18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer				
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-44.4	0.0						-44.4		
-45.9	1.5		SAND, poorly-graded, mostly angular to subangular medium to coarse-grained sand-sized quartz, few angular to subangular shell up to 1/4", wet, 5Y 5/2 olive gray (SP)	67	1		SPT Sampler	4 2 4	6
			LIMESTONE, sandy, sparsely fossiliferous, moderately hard, slightly weathered, fine grained, thick bedding, bedding orientation, solid, moist, 5Y 5/2 olive gray	60	RUN	RQD # 1 26	4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 300 psi DFR = 25 %		
-50.4	6.0		SAND, silty, mostly angular to subangular fine-grained sand-sized quartz, little silt, few subrounded phosphate up to 1/8", moist, 5Y 6/2 light olive gray (SM)	87	2		SPT Sampler	8 10 11	21
				87	3		SPT Sampler	7 13 17	30
				80	4		SPT Sampler	4 5 11	16
				100	5		SPT Sampler	5 8 11	19
				100	6		SPT Sampler	3 4 6	10
				87	7		SPT Sampler	6 10	

DRILLING LOG (Cont. Sheet)				INSTALLATION Jacksonville District				SHEET 2 OF 2 SHEETS							
PROJECT Jacksonville Harbor GRR				COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83		VERTICAL MLLW							
LOCATION COORDINATES X = 500,552 Y = 2,201,768				ELEVATION TOP OF BORING -44.4 Ft.											
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE						
-61.4	17.0		At El. -60.9 Ft., moderate cementation	87	7		-59.9 SPT Sampler	18	28						
				100	8		-61.4 SPT Sampler	4 9 31	40						
			SILT, inorganic-H, low plasticity, hard, few angular to subangular fine-grained sand-sized quartz, moist, 5Y 6/2 light olive gray (MH)	100	9		-61.8 SPT Sampler	50/0.4'							
							-62.9 Advanced Boring								
				89	10		-63.8 SPT Sampler	14 50/0.4'							
							-64.4 Advanced Boring								
				100	11		-65.9 SPT Sampler	12 14 18	32						
-65.9	21.5		At El. -64.4 Ft., discontinue fine-grained sand-sized quartz												
<p>NOTES:</p> <ol style="list-style-type: none"> USACE Jacksonville is the custodian for these original files. Soils are field visually classified in accordance with the Unified Soils Classification System. Set 55.5 ft. of 6" flush joint steel casing Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek. Water depth of -47.5 ft. recorded at 12:04 PM on 1/18/2010. Tide gage reading of +3.1 ft. mllw Compressive Strength Test of Rock Core At Elevation -46.4' to -47.1' = 414 PSI. Laboratory Testing Results <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.0/1.5</td> <td>SP*</td> </tr> </tbody> </table> <p>*Lab visual classification based on gradation curve. No Atterberg limits.</p>										SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION	1	0.0/1.5	SP*
SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION													
1	0.0/1.5	SP*													

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 2 SHEETS			
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks					
2. BORING DESIGNATION CB-JHPM09-18		LOCATION COORDINATES X = 502,018 Y = 2,203,023		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83			
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER			
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES		DISTURBED 8			
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD) 0			
6. THICKNESS OF OVERBURDEN N/A				14. ELEVATION GROUND WATER		TIDAL			
7. DEPTH DRILLED INTO ROCK N/A				15. DATE BORING		STARTED 01-17-10			
8. TOTAL DEPTH OF BORING 18.5 Ft.				16. ELEVATION TOP OF BORING		COMPLETED 01-17-10			
				17. TOTAL RECOVERY FOR BORING		76 %			
				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer					
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-44.1	0.0	 Slightly Weathered	SAND, poorly-graded with silt, mostly angular to subangular fine to medium-grained sand-sized quartz, few angular to subangular shell up to 3/8", few silt, wet, 5Y 2.5/1 black (SP-SM) At El. -44.4 Ft., 5Y 5/2 olive gray At El. -45.5 Ft., Cored Thru 3" Steel Bar In Borehole Encrusted In Cemented Sand/Limestone LIMESTONE, sandy, sparsely fossiliferous, moderately hard, slightly weathered, fine grained, thick bedding, bedding orientation, pitted, moist, 5Y 5/2 olive gray	71	1		-44.1	6	58+
-45.8	1.7						SPT Sampler	8	
								50/0.4'	
-51.1	7.0				SAND, poorly-graded, mostly angular to subangular fine to medium-grained sand-sized quartz, moist, weak cementation, 5Y 7/2 light gray (SP) At El. -53.6 Ft., no cementation	36	RUNRQD # 1	22	4 x 5-1/2" Diamond Impregnated Bit DT = 6 mins HP = 300 psi DFR = 25 %
						BOX 1			
								-50.1	
-55.9	11.8		SAND, silty, mostly angular to subangular fine-grained sand-sized quartz, little silt, moist, 5Y 6/2 light olive gray (SM) At El. -56.6 Ft., strong cementation, 5Y 5/2 olive gray	78		RUNRQD # 2	0	4 x 5-1/2" Diamond Impregnated Bit DT = 2 mins HP = 250 psi DFR = 0 %	
						BOX 2			
								-55.1	
				SAND, silty, mostly angular to subangular fine-grained sand-sized quartz, little silt, moist, 5Y 6/2 light olive gray (SM) At El. -56.6 Ft., strong cementation, 5Y 5/2 olive gray	100	2		SPT Sampler	10
								-56.6	
								21	
			SAND, silty, mostly angular to subangular fine-grained sand-sized quartz, little silt, moist, 5Y 6/2 light olive gray (SM) At El. -56.6 Ft., strong cementation, 5Y 5/2 olive gray		100	3		SPT Sampler	15
								-58.1	
								28	
				SAND, silty, mostly angular to subangular fine-grained sand-sized quartz, little silt, moist, 5Y 6/2 light olive gray (SM) At El. -56.6 Ft., strong cementation, 5Y 5/2 olive gray	93	4		SPT Sampler	31
								-58.1	
								32	
								SPT Sampler	8

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS								
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW								
LOCATION COORDINATES X = 502,018 Y = 2,203,023			ELEVATION TOP OF BORING -44.1 Ft.											
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE					
-62.6	18.5		At El. -60.6 Ft., few angular to subangular shell up to 1-1/2"	93	4		-59.6 SPT Sampler	16	24					
									9	36				
				100	5		SPT Sampler	13						
									-61.1	23				
				100	6		SPT Sampler	14	86					
								36						
							-62.6	50						
NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Set 55.5 ft. of 6" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek. 5. Water depth of -46.7 ft. recorded at 08:13 AM on 1/17/2010. Tide gage reading of +2.6 ft. mllw 6. Compressive Strength Test of Rock Core At Elevation -45.9' to -46.6' = 406 PSI. 7. Laboratory Testing Results					140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.). Abbreviations: DT = Drill Time. HP = Hydraulic Pressure. DFR = Drill Fluid Return.									
<table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.0/1.4</td> <td>SP-SM*</td> </tr> </tbody> </table>			SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION	1	0.0/1.4	SP-SM*						
SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION												
1	0.0/1.4	SP-SM*												
*Lab visual classification based on gradation curve. No Atterberg limits.														

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District			SHEET 1 OF 2 SHEETS			
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks						
2. BORING DESIGNATION CB-JHPM09-19		LOCATION COORDINATES X = 503,819 Y = 2,203,743		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW			
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER				
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES		DISTURBED 10	UNDISTURBED (UD) 0			
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES		0				
6. THICKNESS OF OVERBURDEN N/A				14. ELEVATION GROUND WATER		TIDAL				
7. DEPTH DRILLED INTO ROCK N/A				15. DATE BORING		STARTED 01-16-10	COMPLETED 01-16-10			
8. TOTAL DEPTH OF BORING 17.9 Ft.				16. ELEVATION TOP OF BORING		-45.9 Ft.				
				17. TOTAL RECOVERY FOR BORING		91 %				
				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer						
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE	
-45.9	0.0		LIMESTONE, sandy, fossiliferous, very soft, highly weathered, fine grained, porous, moist, 5Y 5/2 olive gray	67	1		-45.9	4	56	
						SPT Sampler	17			
							-47.4	39	7	
					100	2		SPT Sampler		4
							-48.9	3		
				At El. -49.4 Ft., moderately hard, slightly weathered, pitted, shelly sand filled pits, 5Y 6/2 light olive gray	100	3		SPT Sampler	3	
							-49.7	50/0.3'		
							-50.4	Advanced Boring		
					100	4		-50.8	SPT Sampler	50/0.4'
					86	Run # 1	RQD 20	4 x 5-1/2" Diamond Impregnated Bit DT = 2 mins HP = 300 psi DFR = 30 %		5
							-52.9			
			At El. -55.4 Ft., soft, moderately weathered, massive bedding, bedding orientation	90	Run # 2	RQD 27	4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 300 psi DFR = 30 %		10	
			At El. -56.9 Ft., very soft							
-57.9	12.0		SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, trace phosphate, moist, 5Y 6/2 light olive gray (SM)	100	5		-57.9	12	31	
							SPT Sampler	12		
						-59.4	19			
				100	6		SPT Sampler	20		
							-60.3	50/0.4'		
							-60.9	Advanced Boring		

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS			
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW			
LOCATION COORDINATES X = 503,819 Y = 2,203,743			ELEVATION TOP OF BORING -45.9 Ft.						
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-63.8	17.9			100	7		SPT Sampler	10 12 25	37
							-62.4		
				86	8		SPT Sampler	20 25 50/0.4'	75+
							-63.8		
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Set 55.5 ft. of 6" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek. 5. Water depth of -48.9 ft. recorded at 08:36 AM on 1/16/2010. Tide gage reading of +3.0 ft. mllw				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.). Abbreviations: DT = Drill Time. HP = Hydraulic Pressure. DFR = Drill Fluid Return.		

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 2 SHEETS			
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks					
2. BORING DESIGNATION CB-JHPM09-20		LOCATION COORDINATES X = 506,734 Y = 2,203,513		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83			
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER			
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES 14		UNDISTURBED (UD) 0			
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES 2		14. ELEVATION GROUND WATER TIDAL			
6. THICKNESS OF OVERBURDEN N/A				15. DATE BORING 01-14-10		COMPLETED 01-14-10			
7. DEPTH DRILLED INTO ROCK N/A				16. ELEVATION TOP OF BORING -43.6 Ft.		17. TOTAL RECOVERY FOR BORING 84 %			
8. TOTAL DEPTH OF BORING 21.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer					
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-43.6	0.0		SAND, poorly-graded with silt, mostly angular to subangular fine to medium-grained sand-sized quartz, some angular shell up to 1-1/2", few silt, wet, 5Y 5/3 olive (SP-SM) At El. -43.9 Ft., 5Y 4/1 dark gray At El. -44.4 Ft., few angular shell up to 3/8", 5Y 6/2 light olive gray At El. -45.1 Ft., few angular shell up to 1-1/2"	67	1		-43.6	1	0
							SPT Sampler	2	7
							-45.1	5	
				87	2		SPT Sampler	7	15
							-46.6	8	
				93	3		SPT Sampler	12	30
			At El. -47.9 Ft., some angular shell up to 2"				-48.1	14	
				80	4		SPT Sampler	16	5
							-49.6	3	19
								5	
			At El. -50.1 Ft., trace angular to subangular shell up to 3/8"	100	5		SPT Sampler	14	25
-51.1	7.5		SHELL, mostly angular shell up to 1", little subrounded limestone up to 3/4", little fine-grained sand-sized quartz, wet, 5Y 6/2 light olive gray	73	6		-51.1	12	12
								3	
							-52.6	5	
								7	
				100	7		SPT Sampler	23	57
			SAND, poorly-graded with silt, mostly fine to medium-grained sand-sized quartz, moist, moderate cementation, 5Y 7/1 light gray (SP-SM)				-54.1	27	10
								30	
				87	8		SPT Sampler	8	21
							-55.6	7	
			At El. -55.6 Ft., 5Y 4/1 dark gray	100	9		SPT Sampler	14	
							-56.0	50/0.4'	
							Advanced Boring		
				75	10		-57.1		
							-57.5	50/0.4'	
			At El. -58.1 Ft., no cementation				Advanced Boring		
							-58.6		15

DRILLING LOG		DIVISION South Atlantic	INSTALLATION Jacksonville District	SHEET 1 OF 2 SHEETS
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL			9. SIZE AND TYPE OF BIT See Remarks	
2. BORING DESIGNATION CB-JHPM09-21		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		VERTICAL MLLW
4. NAME OF DRILLER Marvin Strickland		12. TOTAL SAMPLES 14		UNDISTURBED (UD) 0
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		13. TOTAL NUMBER CORE BOXES 1		14. ELEVATION GROUND WATER TIDAL
6. THICKNESS OF OVERBURDEN N/A		15. DATE BORING 01-13-10		STARTED 01-13-10
7. DEPTH DRILLED INTO ROCK N/A		16. ELEVATION TOP OF BORING -42.4 Ft.		COMPLETED 01-13-10
8. TOTAL DEPTH OF BORING 21.0 Ft.		17. TOTAL RECOVERY FOR BORING 90 %		18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
-42.4	0.0		SAND, poorly-graded, mostly angular to subangular medium to coarse-grained sand-sized quartz, few angular shell up to 1/4", wet, moderate cementation, 5Y 6/2 light olive gray (SP)	80	1		-42.4	9	0
							SPT Sampler	11	25
				87	2		-43.9	10	
							SPT Sampler	9	21
			At El. -45.4 Ft., discontinue shell				-45.4	12	
				87	3			10	
							SPT Sampler	12	30
							-46.9	18	
				80	4			15	5
							SPT Sampler	14	31
							-48.4	17	
				73	5			11	
							SPT Sampler	12	28
-49.9	7.5						-49.9	16	
			SAND, poorly-graded with silt, mostly angular to subangular fine to medium-grained sand-sized quartz, trace angular to subangular shell up to 1/8" (SP-SM)	100	6			11	
							SPT Sampler	12	26
-51.4	9.0						-51.4	14	
-51.9	9.5		LIMESTONE, sandy, sparsely fossiliferous, soft, slightly weathered, fine grained, moist, 5Y 6/2 light olive gray	100	7			9	
			LIMESTONE, hard				-52.2	50/0.3'	
							-52.9		10
				100	8		-53.3	50/0.4'	
							Advanced Boring		
-54.4	12.0						-54.4		
			LIMESTONE, very soft, highly weathered					7	
				100	9			12	27
							-55.9	15	
								12	
				100	10			44	81
							SPT Sampler	37	
-57.4	15.0						-57.4		

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS											
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW											
LOCATION COORDINATES X = 507,874 Y = 2,202,216			ELEVATION TOP OF BORING -42.4 Ft.														
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE								
-63.4	21.0		SILT, inorganic-L, low plasticity, hard, dry, 5Y 7/1 light gray (ML) At El. -60.4 Ft., medium plasticity, hard, few clay, 5Y 6/2 light olive gray	100	11		SPT Sampler	15	44								
								20									
								24									
				67	12		SPT Sampler	10	39								
								15									
								24									
				100	13		SPT Sampler	9	40								
								17									
								23									
				100	14		SPT Sampler	28	20								
29																	
37																	
NOTES:																	
1. USACE Jacksonville is the custodian for these original files.																	
2. Soils are field visually classified in accordance with the Unified Soils Classification System.																	
3. Set 55.5 ft. of 6" flush joint steel casing																	
4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek.																	
5. Water depth of -46.1 ft. recorded at 08:39 AM on 1/13/2010. Tide gage reading of +3.7 ft. mllw																	
6. Additional lab test results were added February 2011																	
7. Laboratory Testing Results																	
<table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>1.5/3.0</td> <td>SP-SM*</td> </tr> <tr> <td>6</td> <td>7.5/9.0</td> <td>SP-SM*</td> </tr> </tbody> </table>			SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION	2	1.5/3.0	SP-SM*	6	7.5/9.0	SP-SM*						
SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION															
2	1.5/3.0	SP-SM*															
6	7.5/9.0	SP-SM*															
*Lab visual classification based on gradation curve. No Atterberg limits.																	

Boring Designation CB-JHPM09-22

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 2 SHEETS	
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks			
				10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	
2. BORING DESIGNATION CB-JHPM09-22		LOCATION COORDINATES X = 509,269 Y = 2,201,526		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig			
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		12. TOTAL SAMPLES 13		DISTURBED 0	
4. NAME OF DRILLER Marvin Strickland				13. TOTAL NUMBER CORE BOXES 2			
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL		14. ELEVATION GROUND WATER TIDAL			
6. THICKNESS OF OVERBURDEN N/A				15. DATE BORING		STARTED 01-13-10	
7. DEPTH DRILLED INTO ROCK N/A				16. ELEVATION TOP OF BORING		COMPLETED 01-13-10	
8. TOTAL DEPTH OF BORING 19.5 Ft.				17. TOTAL RECOVERY FOR BORING 93 %			
				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer			

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-44.3	0.0						-44.3		
			SAND, poorly-graded, mostly angular to subangular fine to medium-grained sand-sized quartz, few angular shell up to 3/4", wet, 5Y 5/1 gray (SP)	100	1		SPT Sampler	2 1	0 4
-45.7	1.4						-45.8	3	
			LIMESTONE, sandy, sparsely fossiliferous, soft, moderately weathered, fine grained, moist, 5Y 4/3 olive	100	2		SPT Sampler	8 7	16
							-47.3	9	
				100	3		SPT Sampler	10 12	22
							-48.8	10	
				80	4		SPT Sampler	7 14	5 25
							-50.3	11	
				87	5		SPT Sampler	10 17	36
							-51.8	19	
				93	6		SPT Sampler	9 17	47
			At El. -53.1 Ft., 5Y 5/1 gray				-53.3	30	
				100	7		SPT Sampler	18 22	51
							-54.8	29	
				92	8		SPT Sampler	9 47	97+
			At El. -55.3 Ft., moderately hard, slightly weathered				-56.1	50/0.3'	
							-56.3	Advanced Boring	
				100	9		SPT Sampler	41	
							-57.2	50/0.4'	
							-57.8	Advanced Boring	
				80	10		SPT Sampler	50	
							-58.3	Advanced Boring	
							-59.3		

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS								
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW								
LOCATION COORDINATES X = 509,269 Y = 2,201,526			ELEVATION TOP OF BORING -44.3 Ft.											
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE					
-62.3	18.0	Slightly Weathered		80	11		SPT Sampler	36 37 50	87					
						-60.8								
				100	12		-61.2	SPT Sampler	50/0.4'					
							-62.3	Advanced Boring						
-63.8	19.5	SAND, poorly-graded with silt, mostly fine-grained sand-sized quartz, moist, 5Y 4/2 olive gray (SP-SM)		100	13		SPT Sampler	21 12 18	30					
										-63.8				
		NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Set 55.5 ft. of 6" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek. 5. Water depth of -45.2 ft. recorded at 12:45 PM on 1/13/2010. Tide gage reading of +0.9 ft. mllw 6. Additional lab test results were added February 2011 7. Laboratory Testing Results <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.0/1.5</td> <td>SP-SM*</td> </tr> </tbody> </table> *Lab visual classification based on gradation curve. No Atterberg limits.	SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION	1	0.0/1.5	SP-SM*				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		
SAMPLE ID	SAMPLE DEPTH		LABORATORY CLASSIFICATION											
1	0.0/1.5		SP-SM*											

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District			SHEET 1 OF 2 SHEETS		
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks					
2. BORING DESIGNATION CB-JHPM09-23		LOCATION COORDINATES X = 511,076 Y = 2,200,149		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW		
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER			
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES		DISTURBED 9	UNDISTURBED (UD) 0		
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES		2			
6. THICKNESS OF OVERBURDEN N/A				14. ELEVATION GROUND WATER		TIDAL			
7. DEPTH DRILLED INTO ROCK N/A				15. DATE BORING		STARTED 01-15-10	COMPLETED 01-15-10		
8. TOTAL DEPTH OF BORING 18.5 Ft.				16. ELEVATION TOP OF BORING		-43.9 Ft.			
				17. TOTAL RECOVERY FOR BORING		88 %			
				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer					
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-43.9	0.0								
-44.2	0.3		SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, few angular to subangular shell up to 3/8", trace concrete debris up to 1-3/8", wet, 5Y 4/1 dark gray (SM)	100	1		-43.9		
			LIMESTONE, fossiliferous, moderately hard, slightly weathered, fine grained, pitted, sand filled pits, 5Y 5/2 olive gray		BOX 1				
				62	Run #1	RQD 14	4 x 5-1/2" Diamond Impregnated Bit DT = 3 mins HP = 300 psi DFR = 20 %		
-49.4	5.5						-49.4		
-49.7	5.8		LIMESTONE, hard		BOX 2				
			LIMESTONE, sandy, soft, highly weathered		Run #2	RQD 11	4 x 5-1/2" Diamond Impregnated Bit DT = 2 mins HP = 300 psi DFR = 20 %		
-52.7	8.8								
-53.4	9.5		LIMESTONE, hard, slightly weathered, solid				-53.4		
			SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, moist, organic odor, 5Y 6/2 light olive gray (SM)	100	2		SPT Sampler	13	
			At El. -54.9 Ft., dry					18	
								18	
				100	3		SPT Sampler	17	
								24	
								30	
				100	4		SPT Sampler	14	
								23	
								28	
				100	5		SPT Sampler	8	
								18	

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS			
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW			
LOCATION COORDINATES X = 511,076 Y = 2,200,149			ELEVATION TOP OF BORING -43.9 Ft.						
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-62.4	18.5			100	5		-59.4 SPT Sampler	23	41
				100	6		SPT Sampler	10 17 24	41
				100	7		SPT Sampler	13 19 26	45
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Set 55.5 ft. of 6" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at Sister's Creek. 5. Water depth of -45.8 ft. recorded at 13:00 PM on 1/15/2010. Tide gage reading of +1.9 ft. mllw				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.). Abbreviations: DT = Drill Time. HP = Hydraulic Pressure. DFR = Drill Fluid Return.		

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 2 SHEETS			
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks					
2. BORING DESIGNATION CB-JHPM09-24		LOCATION COORDINATES X = 512,584 Y = 2,198,802		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83			
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER			
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES		DISTURBED 14			
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD) 0			
6. THICKNESS OF OVERBURDEN N/A				14. ELEVATION GROUND WATER		TIDAL			
7. DEPTH DRILLED INTO ROCK N/A				15. DATE BORING		STARTED 01-12-10			
8. TOTAL DEPTH OF BORING 21.0 Ft.				16. ELEVATION TOP OF BORING		COMPLETED 01-12-10			
				17. TOTAL RECOVERY FOR BORING		92 %			
				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer					
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-43.5	0.0		SAND, silty, mostly angular to subangular medium to coarse-grained sand-sized quartz, few angular shell up to 1/4", few silt, wet, 2.5Y 6/2 light brownish gray (SM)	73	1		-43.5	9	0
-45.0	1.5		LIMESTONE, sandy, sparsely fossiliferous, very soft, slightly weathered, fine grained, moist, 5Y 7/2 light gray	80	2		-45.0	13	28
			At El. -47.5 Ft., moderately hard, slightly weathered	73	3		-46.5	19	44
				89	4		-48.0	25	54
				100	5		-48.9	35	5
				100	6		-49.5	50/0.4'	
			At El. -52.5 Ft., soft, highly weathered	100	7		-51.0	10	36
				100	8		-51.4	24	37
				100	9		-52.5	12	80
			SAND, poorly-graded, mostly angular to subangular fine to medium-grained sand-sized quartz, moist, 5Y 6/1 gray (SP)	80	10		-54.0	46	48
			SAND, poorly-graded with silt, mostly angular to subangular fine-grained sand-sized quartz, few silt, moist, 5Y 5/2 olive gray (SP-SM)				-55.5	6	
							-57.0	19	
							-58.0	28	
							-58.5	50	15

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 2 SHEETS			
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks					
2. BORING DESIGNATION CB-JHPM09-25		LOCATION COORDINATES X = 514,028 Y = 2,198,355		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83			
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER			
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES		DISTURBED 9			
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD) 0			
6. THICKNESS OF OVERBURDEN N/A				14. ELEVATION GROUND WATER		TIDAL			
7. DEPTH DRILLED INTO ROCK N/A				15. DATE BORING		STARTED 08-29-09			
8. TOTAL DEPTH OF BORING 12.3 Ft.				16. ELEVATION TOP OF BORING		COMPLETED 08-29-09			
				17. TOTAL RECOVERY FOR BORING		80 %			
				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer					
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-48.2	0.0		SAND, silty, mostly subangular fine to medium-grained sand-sized quartz, some silt, little angular to subangular shell up to 1", few limestone up to 2", wet, 5Y 2.5/1 black (SM) At El. -49.7 Ft., trace angular to subangular shell up to 1/4"	33	1		-48.2	4	0
							SPT Sampler	1	4
				80	2		-49.7	3	
							SPT Sampler	7	43
							-51.2	17	
			At El. -51.2 Ft., discontinue limestone, moist, organic odor, 10Y 3/1 very dark greenish gray	87	3		SPT Sampler	26	26
							-52.7	7	
			At El. -52.7 Ft., discontinue shell	87	4		SPT Sampler	10	5
							-54.2	16	
				87	5		SPT Sampler	12	25
							-55.7	14	
				100	6		SPT Sampler	11	13
							-57.2	4	
				87	7		SPT Sampler	5	16
							-58.7	8	
				93	8		SPT Sampler	7	9
							-60.2	2	10
				80	9		SPT Sampler	3	
-59.7	11.5		LIMESTONE, sandy, sparsely fossiliferous, moderately hard, slightly weathered, fine grained, moist, 5GY 6/1 greenish gray	80	8		-59.7	6	58
-60.5	12.3	SW	At El. -60.2 Ft., 10Y 5/1 greenish gray	67	9		-60.5	10	
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).	25	
								33	
								50/0.3'	

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS									
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW									
LOCATION COORDINATES X = 514,028 Y = 2,198,355			ELEVATION TOP OF BORING -48.2 Ft.												
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE						
			accordance with the Unified Soils Classification System. 3. Set 56.5 ft. of 4" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Mayport Bar Pilots Dock. 5. Water depth of -50.0 ft. recorded at 12:05 PM on 8/29/09. Tide gage reading of +1.8 ft. mllw 6. Laboratory Testing Results <table border="1"><thead><tr><th>SAMPLE ID</th><th>SAMPLE DEPTH</th><th>LABORATORY CLASSIFICATION</th></tr></thead><tbody><tr><td>2</td><td>1.5/3.0</td><td>SM*</td></tr></tbody></table> *Lab visual classification based on gradation curve. No Atterberg limits.	SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION	2	1.5/3.0	SM*						
SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION													
2	1.5/3.0	SM*													

15

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25

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DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District			SHEET 1 OF 2 SHEETS		
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks					
2. BORING DESIGNATION CB-JHPM09-26		LOCATION COORDINATES X = 516,172 Y = 2,199,461		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW		
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER			
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES		DISTURBED 14	UNDISTURBED (UD) 0		
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES 1		14. ELEVATION GROUND WATER TIDAL			
6. THICKNESS OF OVERBURDEN N/A				15. DATE BORING		STARTED 08-25-09	COMPLETED 08-25-09		
7. DEPTH DRILLED INTO ROCK N/A				16. ELEVATION TOP OF BORING -40.6 Ft.		17. TOTAL RECOVERY FOR BORING 88 %			
8. TOTAL DEPTH OF BORING 21.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer					
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RCD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
-40.6	0.0		SAND, poorly-graded, mostly angular to subangular fine to medium-grained sand-sized quartz, trace angular to subangular shell up to 1/8", wet, 5Y 5/4 olive (SP)	60	1		-40.6	0	0
							SPT Sampler	0	
				60	2		-42.1	3	17
							SPT Sampler	5	
			At El. -43.6 Ft., 2.5Y 6/3 light yellowish brown	73	3		-43.6	12	14
							SPT Sampler	8	
				73	4		-45.1	6	5
			At El. -45.6 Ft., few angular to subangular shell up to 3/8", trace limestone up to 1/2", 5Y 5/2 olive gray				SPT Sampler	15	
				73	4		-46.6	24	44
							SPT Sampler	20	
-47.1	6.5		SAND, poorly-graded with silt, mostly angular to subangular fine to medium-grained sand-sized quartz, few silt, moist, 5Y 3/2 dark olive gray (SP-SM)	93	5		-48.1	6	25
							SPT Sampler	11	
				100	6		-49.6	14	34
							SPT Sampler	8	
-49.6	9.0		SAND, silty, mostly angular to subangular fine-grained sand-sized quartz, little silt, moist, 5Y 3/2 dark olive gray (SM)	100	7		-51.1	3	10
			At El. -50.6 Ft., few angular to subangular shell up to 3/8"				SPT Sampler	3	
			At El. -51.1 Ft., discontinue shell, 5Y 4/2 olive gray	100	8		-52.6	14	42
							SPT Sampler	17	
				100	9		-53.5	18	
							SPT Sampler	24	
-54.1	13.5		LIMESTONE, sandy, non-fossiliferous, moderately hard, moderately weathered, fine grained, 5Y 7/2 light gray	100	10		-54.1	14	
							Advanced Boring	50/0.4'	
							SPT Sampler	14	
							Advanced Boring	50/0.4'	
							-55.6		15

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS			
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW			
LOCATION COORDINATES X = 516,172 Y = 2,199,461			ELEVATION TOP OF BORING -40.6 Ft.						
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-57.1	16.5	Mod. Wea.		87	11		SPT Sampler	49	
							-56.4	50/0.3'	
							-57.1	Advanced Boring	
-58.6	18.0		CLAY, fat, medium plasticity, firm, trace angular to subangular fine-grained sand-sized quartz, dry, 10Y 5/1 greenish gray (CH)	100	12		SPT Sampler	10	
								12	
							-58.6	14	26
			SAND, clayey, low plasticity, firm, some angular to subangular fine-grained sand-sized quartz, dry, 10Y 5/1 greenish gray (SC)	100	13		SPT Sampler	12	
								11	
							-60.1	12	23
-61.6	21.0			100	14		SPT Sampler	16	
								17	
							-61.6	20	37
			NOTES:				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		
			1. USACE Jacksonville is the custodian for these original files.						
			2. Soils are field visually classified in accordance with the Unified Soils Classification System.						
			3. Set 54.5 ft. of 4" flush joint steel casing						
			4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Mayport Bar Pilots Dock.						
			5. Water depth of -42.0 ft. recorded at 08:33 AM on 8/25/09. Tide gage reading of +1.4 ft. mllw						
			6. Additional lab test results were added February 2011						
			7. Laboratory Testing Results						
			SAMPLE ID SAMPLE DEPTH LABORATORY CLASSIFICATION						
			2 1.5/3.0 SP*						
			5 6.0/7.5 SP-SM*						
			7 9.0/10.5 SP-SM*						
			*Lab visual classification based on gradation curve. No Atterberg limits.						

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 2 SHEETS			
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks					
2. BORING DESIGNATION CB-JHPM09-27		LOCATION COORDINATES X = 518,015 Y = 2,200,448		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83 VERTICAL MLLW			
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER			
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES 9		DISTURBED 0 UNDISTURBED (UD)			
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED		DEG. FROM VERTICAL		13. TOTAL NUMBER CORE BOXES 2					
6. THICKNESS OF OVERBURDEN N/A				14. ELEVATION GROUND WATER TIDAL					
7. DEPTH DRILLED INTO ROCK N/A				15. DATE BORING 08-28-09		COMPLETED 08-29-09			
8. TOTAL DEPTH OF BORING 13.5 Ft.				16. ELEVATION TOP OF BORING -49.4 Ft.					
				17. TOTAL RECOVERY FOR BORING 93 %					
				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer					
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-49.4	0.0						-49.4		
-49.6	0.2		SHELL, mostly angular to subangular shell up to 1-1/2", wet, 10Y 3/1 very dark greenish gray	93	1		SPT Sampler	14	
			SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, wet, 10Y 3/1 very dark greenish gray (SM)	100			Advanced Boring	23	73+
			At El. -50.9 Ft., few subrounded limestone up to 1"		2		SPT Sampler	41	
			At El. -51.4 Ft., 10Y 4/1 dark greenish gray				Advanced Boring	50/0.1'	
			At El. -52.9 Ft., few angular to subangular shell up to 3/4", 5Y 5/2 olive gray	100	3		SPT Sampler	11	
							Advanced Boring	50/0.4'	
				87	4		SPT Sampler	18	5
								25	44
-55.4	6.0		CLAY, lean, low plasticity, firm, dry, 10Y 6/1 greenish gray (CL)	93	5		SPT Sampler	18	
			At El. -57.4 Ft., medium plasticity, firm	87	6		SPT Sampler	26	44
								18	
				87	6		SPT Sampler	8	18
								10	
				100	7		SPT Sampler	9	23
								12	10
								11	
			At El. -59.9 Ft., medium plasticity, firm, few angular to subangular fine-grained sand-sized quartz	100	8		SPT Sampler	6	
								8	18
								10	
				87	9		SPT Sampler	6	16
								8	
-62.9	13.5						-62.9	8	
NOTES: 1. USACE Jacksonville is the custodian for these original files.				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).					

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS									
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW									
LOCATION COORDINATES X = 518,015 Y = 2,200,448			ELEVATION TOP OF BORING -49.4 Ft.												
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE						
			2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Set 60.5 ft. of 4" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Mayport Bar Pilots Dock. 5. Water depth of -53.3 ft. recorded at 13:35 PM on 8/28/09. Tide gage reading of +3.9 ft. mllw 6. Additional lab test results were added February 2011 7. Laboratory Testing Results <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>1.5/3.0</td> <td>SM*</td> </tr> </tbody> </table> *Lab visual classification based on gradation curve. No Atterberg limits.	SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION	2	1.5/3.0	SM*						
SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION													
2	1.5/3.0	SM*													

Boring Designation CB-JHPM09-28

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 2 SHEETS	
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks			
2. BORING DESIGNATION CB-JHPM09-28		LOCATION COORDINATES X = 518,631 Y = 2,202,355		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER	
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES		DISTURBED 11	
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD) 0	
6. THICKNESS OF OVERBURDEN N/A				14. ELEVATION GROUND WATER		TIDAL	
7. DEPTH DRILLED INTO ROCK N/A				15. DATE BORING		STARTED 08-28-09	
8. TOTAL DEPTH OF BORING 16.5 Ft.				16. ELEVATION TOP OF BORING		COMPLETED 02-28-09	
				17. TOTAL RECOVERY FOR BORING		94 %	
				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer			

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RCD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
-45.9	0.0						-45.9		
-46.2	0.3		SHELL, mostly angular to subangular shell up to 1", few angular to subangular fine to medium-grained sand-sized quartz, wet, 5Y 4/2 olive gray	80	1		SPT Sampler	5	0
			SAND, silty, mostly angular to subangular fine to medium-grained sand-sized quartz, little silt, trace angular to subangular shell up to 1/4", wet, 10Y 6/1 greenish gray (SM)	100	2		SPT Sampler	9	13
-48.9	3.0		At El. -47.9 Ft., discontinue shell						
			SAND, poorly-graded, mostly angular to subangular fine to medium-grained sand-sized quartz, wet, 10Y 6/1 greenish gray (SP)	100	3		SPT Sampler	4	22
				87	4		SPT Sampler	15	34
				87	5		SPT Sampler	19	5
								8	21
								11	25
								48	
-53.9	8.0		SAND, silty, mostly angular to subangular fine-grained sand-sized quartz, little silt, moist, moderate cementation, 5GY 6/1 greenish gray (SM)	95	6		SPT Sampler	15	
			At El. -55.4 Ft., dry	100	7		SPT Sampler	10	
								31	
								50/0.4'	
								11	
								22	
								50/0.4'	10
								15	
								26	
-57.9	12.0		SILT, inorganic-L, nonplastic, hard, trace subrounded to rounded phosphate up to 1/8", dry, 5GY 6/1 greenish gray (ML)	100	9		SPT Sampler	23	49
								12	
								19	
								20	
								6	
				100	10		SPT Sampler	10	
			At El. -60.4 Ft., low plasticity, hard, few					11	21

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS												
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW												
LOCATION COORDINATES X = 518,631 Y = 2,202,355			ELEVATION TOP OF BORING -45.9 Ft.															
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE									
-62.4	16.5		subrounded to rounded phosphate up to 1/8", few clay At El. -61.9 Ft., trace angular to subangular shell up to 1-1/2"	100	11		SPT Sampler	10 12 16	28									
			NOTES: 1. USACE Jacksonville is the custodian for - these original files. - 2. Soils are field visually classified in - accordance with the Unified Soils - Classification System. - 3. Set 55.5 ft. of 4" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Mayport Bar Pilots Dock. 5. Water depth of -47.7 ft. recorded at 10:55 AM on 8/28/09. Tide gage reading of +1.8 ft. mllw 6. Additional lab test results were added - February 2011 - 7. Laboratory Testing Results <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>1.5/3.0</td> <td>SM*</td> </tr> <tr> <td>4</td> <td>4.5/6.0</td> <td>SM*</td> </tr> </tbody> </table> *Lab visual classification based on gradation curve. No Atterberg limits.	SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION	2	1.5/3.0	SM*	4	4.5/6.0	SM*				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		
SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION																
2	1.5/3.0	SM*																
4	4.5/6.0	SM*																

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District			SHEET 1 OF 2 SHEETS	
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks				
2. BORING DESIGNATION CB-JHPM09-29		LOCATION COORDINATES X = 519,910 Y = 2,203,897		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW	
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER		
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES		DISTURBED 10	UNDISTURBED (UD) 0	
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES		1		
6. THICKNESS OF OVERBURDEN N/A				14. ELEVATION GROUND WATER		TIDAL		
7. DEPTH DRILLED INTO ROCK N/A				15. DATE BORING		STARTED 08-28-09	COMPLETED 08-28-09	
8. TOTAL DEPTH OF BORING 15.0 Ft.				16. ELEVATION TOP OF BORING		-46.3 Ft.		
				17. TOTAL RECOVERY FOR BORING		75 %		
				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer				

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/0.5 FT.	N-VALUE
-46.3	0.0		SAND, poorly-graded, mostly angular to subangular fine to medium-grained sand-sized quartz, some angular to subangular shell up to 1-1/2", wet, 5Y 5/2 olive gray (SP)	67	1		-46.3	6	0
							SPT Sampler	7	12
				67	2		-47.8	5	
							SPT Sampler	4	8
							-49.3	4	
				47	3		SPT Sampler	6	12
-50.8	4.5		SAND, poorly-graded with silt, mostly angular to subangular fine to medium-grained sand-sized quartz, some angular to subangular shell up to 3/4", few silt, wet, 5Y 5/2 olive gray (SP-SM)	73	4		-50.8	6	5
							SPT Sampler	5	11
							-52.3	6	
				73	5		SPT Sampler	2	8
							-53.8	3	
-53.8	7.5		SAND, poorly-graded, mostly angular to subangular medium to coarse-grained sand-sized quartz, some angular to subangular shell up to 3/4", moist, 5Y 5/2 olive gray (SP)	100	6		-53.8	5	
							SPT Sampler	6	16
							-55.3	7	
			At El. -55.8 Ft., mostly angular to subangular fine to medium-grained sand-sized quartz, few angular to subangular shell up to 2", 5Y 6/1 gray	87	7		SPT Sampler	7	15
							-56.8	8	10
				67	8		SPT Sampler	5	14
							-58.3	6	
				100	9		SPT Sampler	1	7
							-59.8	3	
			At El. -59.8 Ft., little angular to subangular shell up to 2"				SPT Sampler	4	7
				73	10		SPT Sampler	2	
-61.3	15.0						-61.3	4	7
								3	15

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS												
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW												
LOCATION COORDINATES X = 519,910 Y = 2,203,897			ELEVATION TOP OF BORING -46.3 Ft.															
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE									
			<p>NOTES:</p> <ol style="list-style-type: none"> USACE Jacksonville is the custodian for these original files. Soils are field visually classified in accordance with the Unified Soils Classification System. Set 55.5 ft. of 4" flush joint steel casing Water depth recorded at start of drilling operations and referenced to the tidal station at the Mayport Bar Pilots Dock. Water depth of -47.8 ft. recorded at 08:20 AM on 8/28/09. Tide gage reading of +1.5 ft. mllw Additional lab test results were added February 2011 Laboratory Testing Results <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.0/1.5</td> <td>SP* -</td> </tr> <tr> <td>4</td> <td>4.5/6.0</td> <td>SP* -</td> </tr> </tbody> </table> <p>*Lab visual classification based on gradation curve. No Atterberg limits.</p>	SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION	1	0.0/1.5	SP* -	4	4.5/6.0	SP* -				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		
SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION																
1	0.0/1.5	SP* -																
4	4.5/6.0	SP* -																

Boring Designation CB-JHPM09-30

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 2 SHEETS			
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks					
2. BORING DESIGNATION CB-JHPM09-30		LOCATION COORDINATES X = 520,152 Y = 2,205,593		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83 VERTICAL MLLW			
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER			
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES		DISTURBED 11 UNDISTURBED (UD) 0			
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES		2			
6. THICKNESS OF OVERBURDEN N/A				14. ELEVATION GROUND WATER		TIDAL			
7. DEPTH DRILLED INTO ROCK N/A				15. DATE BORING		STARTED 08-27-09 COMPLETED 08-27-09			
8. TOTAL DEPTH OF BORING 16.5 Ft.				16. ELEVATION TOP OF BORING		-45.1 Ft.			
				17. TOTAL RECOVERY FOR BORING		71 %			
				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer					
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-45.1	0.0		SAND, silty, mostly angular to subangular fine-grained sand-sized quartz, some angular to subangular shell up to 1-1/2", little silt, wet, 5Y 5/2 olive gray (SM)	67	1		-45.1	10	0
							SPT Sampler	10	22
							-46.6	12	
			At El. -47.6 Ft., little angular to subangular shell up to 2", 5Y 5/1 gray	67	2		SPT Sampler	7	15
							-48.1	8	
								7	
				73	3		SPT Sampler	12	14
							-49.6	7	
			At El. -50.1 Ft., 5Y 5/2 olive gray	73	4		SPT Sampler	5	5
								4	11
-51.1	6.0		SHELL, mostly angular to subangular shell up to 1", few angular to subangular fine-grained sand-sized quartz, wet, 5Y 5/2 olive gray	60	5		-51.1	7	17
								4	
							SPT Sampler	7	
-52.6	7.5		SAND, poorly-graded, some angular to subangular fine-grained sand-sized quartz, few angular to subangular shell up to 3/8", moist, 5Y 5/1 gray (SP)	80	6		-52.6	10	
								5	11
							-54.1	6	
			At El. -54.4 Ft., 5Y 4/2 olive gray	60	7		SPT Sampler	5	10
								4	10
-55.6	10.5		SHELL, mostly angular to subangular shell up to 3/8", few angular to subangular fine-grained sand-sized quartz, moist, 5Y 5/2 olive gray	67	8		-55.6	6	11
								5	
							SPT Sampler	5	
			At El. -57.1 Ft., some angular to subangular fine-grained sand-sized quartz	53	9		-57.1	6	10
								4	
							SPT Sampler	4	
							-58.6	6	
								4	
			At El. -59.1 Ft., mostly angular to subangular shell up to 2", little angular to subangular fine-grained sand-sized quartz	87	10		SPT Sampler	5	12
								7	
							-60.1		

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 2 SHEETS			
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks					
2. BORING DESIGNATION CB-JHPM09-31		LOCATION COORDINATES X = 522,200 Y = 2,206,760		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83 VERTICAL MLLW			
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER			
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES		DISTURBED 10 UNDISTURBED (UD) 0			
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES 1		14. ELEVATION GROUND WATER TIDAL			
6. THICKNESS OF OVERBURDEN N/A				15. DATE BORING		STARTED 08-27-09 COMPLETED 08-27-09			
7. DEPTH DRILLED INTO ROCK N/A				16. ELEVATION TOP OF BORING -46.6 Ft.		17. TOTAL RECOVERY FOR BORING 79 %			
8. TOTAL DEPTH OF BORING 15.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer					
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-46.6	0.0		SAND, poorly-graded with silt, mostly angular to subangular fine to medium-grained sand-sized quartz, some angular to subangular shell up to 1", few silt, wet, 5Y 4/1 dark gray (SP-SM)	67	1		-46.6	5	0
			At El. -48.6 Ft., some shell up to 2"	53	2		-48.1	3	9
				53	3		-49.6	1	3
-51.1	4.5		SHELL, mostly angular to subangular shell up to 1", few angular to subangular fine-grained sand-sized quartz, wet, 5Y 4/1 dark gray	40	4		-51.1	2	5
-52.6	6.0		CLAY, lean, low plasticity, soft, moist, organic odor, 10Y 4/1 dark greenish gray (CL)	100	5		-52.6	2	4
				80	6		-54.1	1	1
				100	7		-55.6	2	4
-57.1	10.5		At El. -56.6 Ft., little angular to subangular shell up to 1"	100	8		-57.1	2	4
			CLAY, fat, medium plasticity, firm, discontinue shell, moist, 10Y 4/1 dark greenish gray (CH)	100	9		-58.6	4	7
			At El. -57.6 Ft., few wood debris	100	10		-60.1	3	6
-61.6	15.0						-61.6	5	11

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS									
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW									
LOCATION COORDINATES X = 522,200 Y = 2,206,760			ELEVATION TOP OF BORING -46.6 Ft.												
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE						
			<p>NOTES:</p> <ol style="list-style-type: none"> USACE Jacksonville is the custodian for these original files. Soils are field visually classified in accordance with the Unified Soils Classification System. Set 55.5 ft. of 4" flush joint steel casing Water depth recorded at start of drilling operations and referenced to the tidal station at the Mayport Bar Pilots Dock. Water depth of -47.8 ft. recorded at 09:15 AM on 8/27/09. Tide gage reading of +1.2 ft. mllw Laboratory Testing Results <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.0/1.5</td> <td>SP-SM*</td> </tr> </tbody> </table> <p>*Lab visual classification based on gradation curve. No Atterberg limits.</p>	SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION	1	0.0/1.5	SP-SM*				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		
SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION													
1	0.0/1.5	SP-SM*													

Boring Designation CB-JHPM09-32


DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 2 SHEETS					
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks							
2. BORING DESIGNATION CB-JHPM09-32		LOCATION COORDINATES X = 524,075 Y = 2,206,438		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83					
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER					
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES 12		UNDISTURBED (UD) 0					
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES 1		14. ELEVATION GROUND WATER TIDAL					
6. THICKNESS OF OVERBURDEN N/A				15. DATE BORING 08-26-09		COMPLETED 08-26-09					
7. DEPTH DRILLED INTO ROCK N/A				16. ELEVATION TOP OF BORING -43.5 Ft.		17. TOTAL RECOVERY FOR BORING 84 %					
8. TOTAL DEPTH OF BORING 18.0 Ft.				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer							
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE		
-43.5	0.0	[Pattern]	SAND, poorly-graded, mostly angular to subangular fine to medium-grained sand-sized quartz, few angular to subangular shell up to 3/4", wet, 5Y 5/2 olive gray (SP)	67	1		-43.5	4	9		
					SPT Sampler	4					
					-45.0	5					
						67	2		SPT Sampler	6	13
								-46.5	7		
									10		
-47.5	4.0					80	3		SPT Sampler	17	31
								-48.0	14		
									5		
				[Pattern]	SAND, poorly-graded with silt, mostly angular to subangular medium to coarse-grained sand-sized quartz, few silt, discontinue shell, moist, 10Y 3/1 very dark greenish gray (SP-SM)	87	4		SPT Sampler	11	23
								-49.5	12		
									5		
						100	5		SPT Sampler	6	20
								-51.0	14		
									2		
						67	6		SPT Sampler	3	5
								-52.5	2		
									9		
						80	7		SPT Sampler	12	29
						-54.0	17				
							10				
				87	8		SPT Sampler	16	33		
						-55.5	17				
							5				
				87	9		SPT Sampler	10	35		
						-57.0	25				
							15				
				87	10		SPT Sampler	25	51		
						-58.5	26				

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS											
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW											
LOCATION COORDINATES X = 524,075 Y = 2,206,438			ELEVATION TOP OF BORING -43.5 Ft.														
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE								
-61.5	18.0			100	11		SPT Sampler	12 21 22	43								
				100	12		SPT Sampler	17 21 18	39								
			NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Set 55.5 ft. of 4" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Mayport Bar Pilots Dock. 5. Water depth of -46.5 ft. recorded at 11:05 AM on 8/26/09. Tide gage reading of +3.0 ft. mllw 6. Additional lab test results were added February 2011 7. Laboratory Testing Results <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>1.5/3.0</td> <td>SP*</td> </tr> <tr> <td>4</td> <td>4.5/6.0</td> <td>SP*</td> </tr> </tbody> </table> *Lab visual classification based on gradation curve. No Atterberg limits.	SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION	2	1.5/3.0	SP*	4	4.5/6.0	SP*				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).	
SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION															
2	1.5/3.0	SP*															
4	4.5/6.0	SP*															

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District		SHEET 1 OF 2 SHEETS				
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks						
2. BORING DESIGNATION CB-JHPM09-33		LOCATION COORDINATES X = 526,130 Y = 2,206,770		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83				
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER				
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES		DISTURBED 8				
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES		UNDISTURBED (UD) 0				
6. THICKNESS OF OVERBURDEN N/A				14. ELEVATION GROUND WATER		TIDAL				
7. DEPTH DRILLED INTO ROCK N/A				15. DATE BORING		STARTED 08-26-09				
8. TOTAL DEPTH OF BORING 12.0 Ft.				16. ELEVATION TOP OF BORING		COMPLETED 08-26-09				
				17. TOTAL RECOVERY FOR BORING		92 %				
				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer						
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE	
-49.2	0.0		CLAY, fat, medium plasticity, firm, few angular to subangular shell up to 1/4", trace wood debris, wet, organic odor, 5Y 3/2 dark olive gray (CH)	100	1		-49.2	1	3	
			At El. -50.7 Ft., discontinue shell				-50.7	2		
					100	2		SPT Sampler	2	4
								-52.2	2	
			At El. -53.2 Ft., few wood debris	93	3		SPT Sampler	3	4	
							-53.7	2		
			At El. -54.7 Ft., 5Y 2.5/2 black	100	4		SPT Sampler	2	5	
							-55.2	2		
-55.2	6.0		SAND, poorly-graded with silt, mostly angular to subangular fine-grained sand-sized quartz, few silt, wet, 5Y 5/2 olive gray (SP-SM)	87	5		SPT Sampler	12	31	
								-56.7		17
					87	6		SPT Sampler	13	27
								-58.2	14	
-58.2	9.0		SAND, silty, mostly angular to subangular fine-grained sand-sized quartz, little silt, wet, 5Y 4/2 olive gray (SM)	67	7		SPT Sampler	5	12	
								-59.7		7
				At El. -60.2 Ft., 10Y 3/1 very dark greenish gray	100	8		SPT Sampler	12	31
								-61.2	16	
-61.2	12.0		NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System.				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).			

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS									
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW									
LOCATION COORDINATES X = 526,130 Y = 2,206,770			ELEVATION TOP OF BORING -49.2 Ft.												
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE						
			3. Set 60.5 ft. of 4" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Mayport Bar Pilots Dock. 5. Water depth of -50.4 ft. recorded at 08:50 AM on 8/26/09. Tide gage reading of +1.2 ft. mllw 6. Additional lab test results were added February 2011 7. Laboratory Testing Results <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.0/1.5</td> <td>MH*</td> </tr> </tbody> </table> *Lab visual classification based on gradation curve. No Atterberg limits.	SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION	1	0.0/1.5	MH*						
SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION													
1	0.0/1.5	MH*													

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District			SHEET 1 OF 2 SHEETS		
1. PROJECT Jacksonville Harbor GRR ST. JOHN'S RIVER CHANNEL				9. SIZE AND TYPE OF BIT See Remarks					
2. BORING DESIGNATION CB-JHPM09-34		LOCATION COORDINATES X = 527,920 Y = 2,206,000		10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW		
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.		CONTRACTOR FILE NO. 2009D08		11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER			
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES		DISTURBED 13	UNDISTURBED (UD) 0		
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES		1			
6. THICKNESS OF OVERBURDEN N/A				14. ELEVATION GROUND WATER		TIDAL			
7. DEPTH DRILLED INTO ROCK N/A				15. DATE BORING		STARTED 08-25-09	COMPLETED 08-25-09		
8. TOTAL DEPTH OF BORING 19.5 Ft.				16. ELEVATION TOP OF BORING		-42.9 Ft.			
				17. TOTAL RECOVERY FOR BORING		77 %			
				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer					
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-42.9	0.0		SHELL, mostly angular to subangular sand to gravel-sized shell up to 3/8", little angular to subangular medium to coarse-grained sand-sized quartz, wet, 5Y 6/1 gray	80	1		-42.9	3	0
-44.4	1.5						SPT Sampler	4	9
			SAND, poorly-graded, mostly angular to subangular fine to medium-grained sand-sized quartz, some angular to subangular shell up to 1", wet, 5Y 6/2 light olive gray (SP)	20	2		-44.4	5	
							SPT Sampler	8	28
							-45.9	12	
							SPT Sampler	16	
							-47.4	18	44
			At El. -47.9 Ft., few angular to subangular shell up to 1"	67	3			20	
							-48.9	24	5
							SPT Sampler	12	33
							-50.4	15	
			At El. -49.7 Ft., some angular to subangular shell up to 1/2"	73	4			18	
							SPT Sampler	10	25
			At El. -50.9 Ft., few angular to subangular shell up to 3/8"	73	5			13	
							-51.9	12	30
							SPT Sampler	21	
			SAND, poorly-graded with silt, mostly angular to subangular fine-grained sand-sized quartz, some angular to subangular shell up to 1/2", few silt, moist, 5Y 4/1 dark gray (SP-SM)	60	6			17	
							-53.4	10	10
							SPT Sampler	10	
							-54.9	12	
			SAND, poorly-graded, mostly angular to subangular fine-grained sand-sized quartz, few angular to subangular shell up to 1/8", moist, 5Y 6/1 gray (SP)	73	7			13	23
							SPT Sampler	12	
							-56.4	11	
			CLAY, fat, medium plasticity, firm, moist, 5GY 4/1 dark greenish gray (CH)	93	8			4	4
							SPT Sampler	2	
							-57.9	2	
							SPT Sampler	3	6
								3	

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 2 SHEETS											
PROJECT Jacksonville Harbor GRR			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW											
LOCATION COORDINATES X = 527,920 Y = 2,206,000			ELEVATION TOP OF BORING -42.9 Ft.														
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE								
-62.4	19.5			100	11		SPT Sampler	2	4								
							-59.4	2									
							2										
					100	12		SPT Sampler	1	4							
							-60.9	2									
							2										
					100	13		SPT Sampler	2	4							
							-62.4	2									
				NOTES: 1. USACE Jacksonville is the custodian for these original files. 2. Soils are field visually classified in accordance with the Unified Soils Classification System. 3. Set 57.5 ft. of 4" flush joint steel casing 4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Mayport Bar Pilots Dock. 5. Water depth of -48.0 ft. recorded at 13:00 PM on 8/25/09. Tide gage reading of +5.1 ft. mllw 6. Additional lab test results were added February 2011 7. Laboratory Testing Results <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>SAMPLE DEPTH</th> <th>LABORATORY CLASSIFICATION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.0/1.5</td> <td>SP*</td> </tr> <tr> <td>4</td> <td>4.5/6.0</td> <td>SP-SM*</td> </tr> </tbody> </table> *Lab visual classification based on gradation curve. No Atterberg limits.	SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION	1	0.0/1.5	SP*	4	4.5/6.0	SP-SM*				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).
SAMPLE ID	SAMPLE DEPTH	LABORATORY CLASSIFICATION															
1	0.0/1.5	SP*															
4	4.5/6.0	SP-SM*															

Boring Designation CB-JHPM09-50

DRILLING LOG		DIVISION South Atlantic		INSTALLATION Jacksonville District			SHEET 1 OF 3 SHEETS	
1. PROJECT Jacksonville Harbor General Reevaluation Report (GRR) EAST MILL COVE WIDENER				9. SIZE AND TYPE OF BIT See Remarks				
2. BORING DESIGNATION CB-JHPM09-50				10. COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83		VERTICAL MLLW
3. DRILLING AGENCY Challenge Engineering & Testing, Inc.				11. MANUFACTURER'S DESIGNATION OF DRILL Diedrich D-50 Truckrig		<input type="checkbox"/> AUTO HAMMER <input checked="" type="checkbox"/> MANUAL HAMMER		
4. NAME OF DRILLER Marvin Strickland				12. TOTAL SAMPLES 28		DISTURBED 0		UNDISTURBED (UD) 0
5. DIRECTION OF BORING <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED				13. TOTAL NUMBER CORE BOXES 0				
6. THICKNESS OF OVERBURDEN N/A				14. ELEVATION GROUND WATER TIDAL				
7. DEPTH DRILLED INTO ROCK N/A				15. DATE BORING 01-22-10		STARTED 01-22-10		COMPLETED 01-22-10
8. TOTAL DEPTH OF BORING 45.3 Ft.				16. ELEVATION TOP OF BORING -18.4 Ft.				
				17. TOTAL RECOVERY FOR BORING 76 %				
				18. SIGNATURE AND TITLE OF INSPECTOR V. J. Thompson III, Civil Engineer				

ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	REC.	BOX OR SAMPLE	ROD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-18.4	0.0						-18.4		
-18.6	0.2		SILT, organic-L, nonplastic, soft, wet, 5Y 2.5/1 black (OL)	27	1		SPT Sampler	0	
			SAND, poorly-graded with silt, mostly angular to subangular fine-grained sand-sized quartz, few silt, trace angular to subangular shell up to 1/4", wet, 5Y 2.5/1 black (SP-SM)	73	2		SPT Sampler	1	2
			At El. -20.2 Ft., little silt, discontinue shell, 5Y 4/2 olive gray					1	
			At El. -21.4 Ft., moist	93	3		SPT Sampler	2	4
								2	
			At El. -23.4 Ft., 5Y 4/1 dark gray	67	4		SPT Sampler	2	3
								2	
				87	5		SPT Sampler	1	5
			At El. -25.9 Ft., trace angular to subangular shell up to 2"	67	6		SPT Sampler	2	4
			At El. -27.4 Ft., discontinue shell	67	7		SPT Sampler	2	10
								2	
				80	8		SPT Sampler	2	4
								2	
			At El. -31.9 Ft., trace angular to subangular shell up to 1/8", 5GY 6/1 greenish gray	93	9		SPT Sampler	2	3
								1	
				87	10		SPT Sampler	4	11
								2	
								9	

Boring Designation CB-JHPM09-50

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 2 OF 3 SHEETS				
PROJECT Jacksonville Harbor General Reevaluation Report (GRR)			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW				
LOCATION COORDINATES X = 484,628 Y = 2,200,417			ELEVATION TOP OF BORING -18.4 Ft.							
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE	
			At El. -34.4 Ft., 2.5Y 5/4 light olive brown	87	11		SPT Sampler	6 3 1	4	
							-34.9			
					100	12		SPT Sampler	1 1 1	2
							-36.4			
					100	13		SPT Sampler	1 1 2	3
							-37.9			
				At El. -37.9 Ft., 10YR 4/4 dark yellowish brown	93	14		SPT Sampler	2 4 3	7
							-39.4			
				80	15		SPT Sampler	3 2 2	4	
						-40.9				
				80	16		SPT Sampler	2 2 3	5	
						-42.4				
				87	17		SPT Sampler	3 1 2	3	
						-43.9				
-43.9	25.5								25	
			LIMESTONE, sandy, soft, highly weathered, fine grained, moist, 5Y 7/4 pale yellow	73	18		SPT Sampler	3 4 6	10	
							-45.4			
					67	19		SPT Sampler	3 6 15	21
							-46.9			
				At El. -46.9 Ft., very soft, 2.5Y 7/6 yellow	60	20		SPT Sampler	6 4 12	16
							-48.4			
				69	21		SPT Sampler	4 11 50/0.3'	61+	
						-49.7				
			At El. -49.4 Ft., sparsely fossiliferous, moderately hard, slightly weathered							
-51.7	33.3		LIMESTONE, sandy, soft	50	Run # 1	RQD 0	4 x 5-1/2" Diamond Impregnated Bit DT = 1 mins HP = 300 psi DFR = 20 %			

Boring Designation CB-JHPM09-50

DRILLING LOG (Cont. Sheet)			INSTALLATION Jacksonville District			SHEET 3 OF 3 SHEETS			
PROJECT Jacksonville Harbor General Reevaluation Report (GRR)			COORDINATE SYSTEM/DATUM State Plane, FLE (U.S. Ft.)		HORIZONTAL NAD83	VERTICAL MLLW			
LOCATION COORDINATES X = 484,628 Y = 2,200,417			ELEVATION TOP OF BORING -18.4 Ft.						
ELEV.	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS	% REC.	BOX OR SAMPLE	RQD OR UD	REMARKS	BLOWS/ 0.5 FT.	N-VALUE
-57.7	39.3	 Highly Weathered	At El. -53.7 Ft., sparsely fossiliferous, moderately hard, solid, 5Y 8/4 pale yellow	50	Run # 1	RQD 0	4 x 5-1/2" Diamond Impregnated Bit DT = 1 mins HP = 300 psi DFR = 20 %	20	35
			At El. -54.7 Ft., very soft, highly weathered	80	22		SPT Sampler	49	67
				87	23		SPT Sampler	11	23
							-56.2	18	
							-57.7	12	
			SAND, poorly-graded with silt, mostly angular to subangular fine to medium-grained sand-sized quartz, few silt, trace angular to subangular shell up to 1/8", moist, 5Y 7/4 pale yellow (SP-SM)	67	24		SPT Sampler	2	40
							-59.2	3	7
								4	
								5	
			At El. -60.2 Ft., weak cementation	87	25		SPT Sampler	10	28
							-60.7	18	
			SAND, poorly-graded, mostly angular to subangular fine-grained sand-sized quartz, moist, weak cementation, 5Y 8/2 pale yellow (SP)	87	26		SPT Sampler	30	69
							-62.2	30	
			At El. -62.2 Ft., trace phosphate, 5Y 7/2 light gray					39	
								17	
				100	27		SPT Sampler	27	77
							-63.7	50	45
			NOTES:				140# hammer w/30" drop used with 2.0' split spoon (1-3/8" I.D. x 2" O.D.).		
			1. USACE Jacksonville is the custodian for these original files.				Abbreviations:		
			2. Soils are field visually classified in accordance with the Unified Soils Classification System.				DT = Drill Time.		
			3. Set 65.5 ft. of 6" flush joint steel casing				HP = Hydraulic Pressure.		
			4. Water depth recorded at start of drilling operations and referenced to the tidal station at the Blount Island Terminal.				DFR = Drill Fluid Return.		
			5. Water depth of -19.1 ft. recorded at 08:19 AM on 1/22/2010. Tide gage reading of +0.7 ft. mllw						50
			6. Laboratory Testing Results						
			SAMPLE ID SAMPLE DEPTH LABORATORY CLASSIFICATION						
			2 1.5/3.0 SP-SM*						
			*Lab visual classification based on gradation curve. No Atterberg limits.						

Grain Size Analysis - Mechanical

Project	USACE- Jacksonville District
Laboratory Name	Dames & Moore - Atlanta
Visual Description of Soil	Poorly Graded Sand
Reaction to HCL	WEAK
Tested By:	DEJ

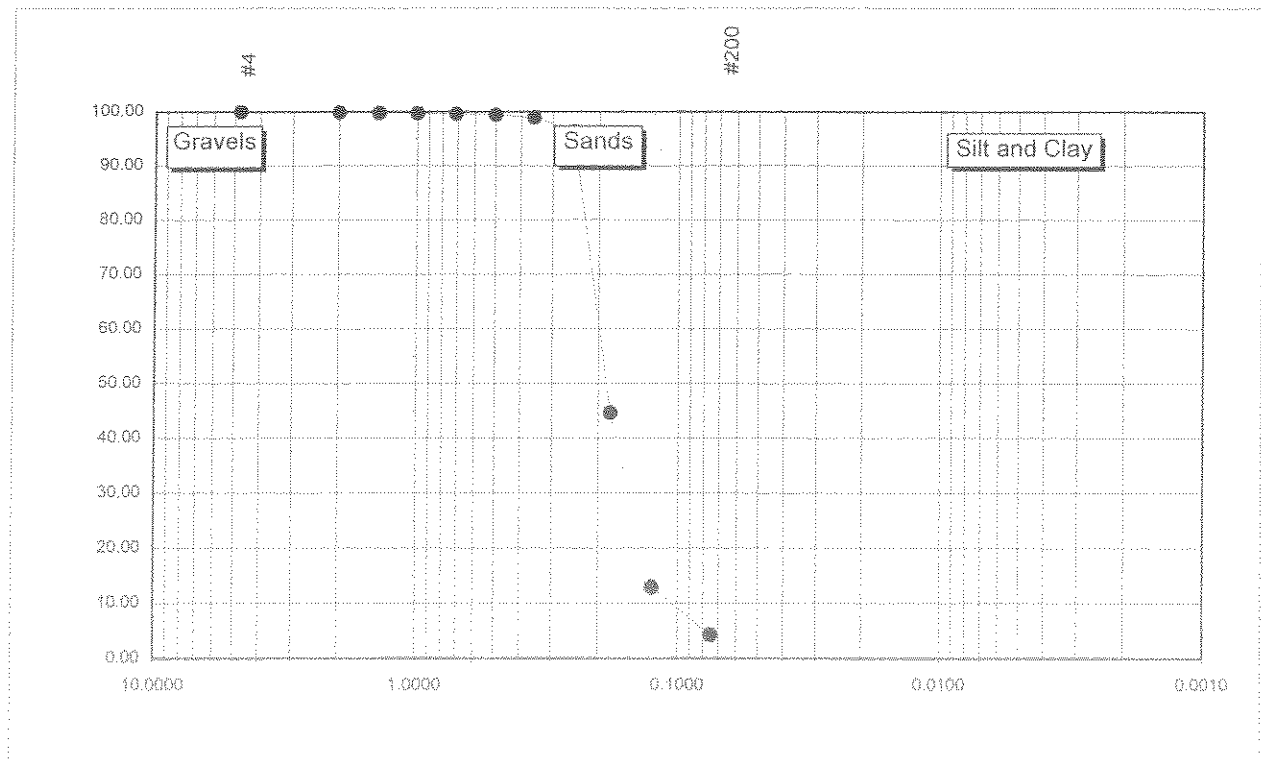
Location	Jacksonville Harbor
Boring No.	CB-JH99-16
Sample No.	1
Elev. of Sample (ft.):	-39.6 To -40.1
Date of Testing:	10-Dec-99
Est. Percent Shell:	<1%

Weight of Soil and Dish:	432.25
Dry Weight Soil and Dish:	313.16
Weight Dish:	8.99
Total Weight:	304.17
Weight Soil & Dish after Washing:	300.24
Weight of Oven Dry after Washing	291.25

10% Passing - D10	0.110
30% Passing - D30	0.170
60% Passing - D60	0.200
Coef. Of Uniformity - Cu	1.82
Coef. Of Curvature - Cc	1.31
Classification:	SP

Sieve No.	Size (mm)	Individual Weight Retained	Cumulative Weight Retained	Cumulative Percent Retained	Cumulative Percent Finer Passing
#4	4.7500	0.01	0.01	0.00	100.00
#10	2.0000	0.33	0.34	0.11	99.89
#14	1.4000	0.30	0.64	0.21	99.79
#18	1.0000	0.20	0.84	0.28	99.72
#25	0.7100	0.40	1.24	0.41	99.59
#35	0.5000	0.57	1.81	0.60	99.40
#45	0.3550	1.52	3.33	1.09	98.91
#60	0.2500	8.01	11.34	3.73	96.27
#80	0.1800	157.21	168.55	55.41	44.59
#120	0.1250	96.40	264.95	87.11	12.89
#200	0.0750	26.19	291.14	95.72	4.28
Pan		0.11	304.17	100.00	0.00

- Notes:
1. All weights in grams.
 2. Total weight equals oven dry weight of grain size sample.



Grain Size Analysis - Mechanical

Project	USACE- Jacksonville District
Laboratory Name	Dames & Moore - Atlanta
Visual Description of Soil	Silty Sand with Gravel
Reaction to HCL	WEAK
Tested By:	DEJ

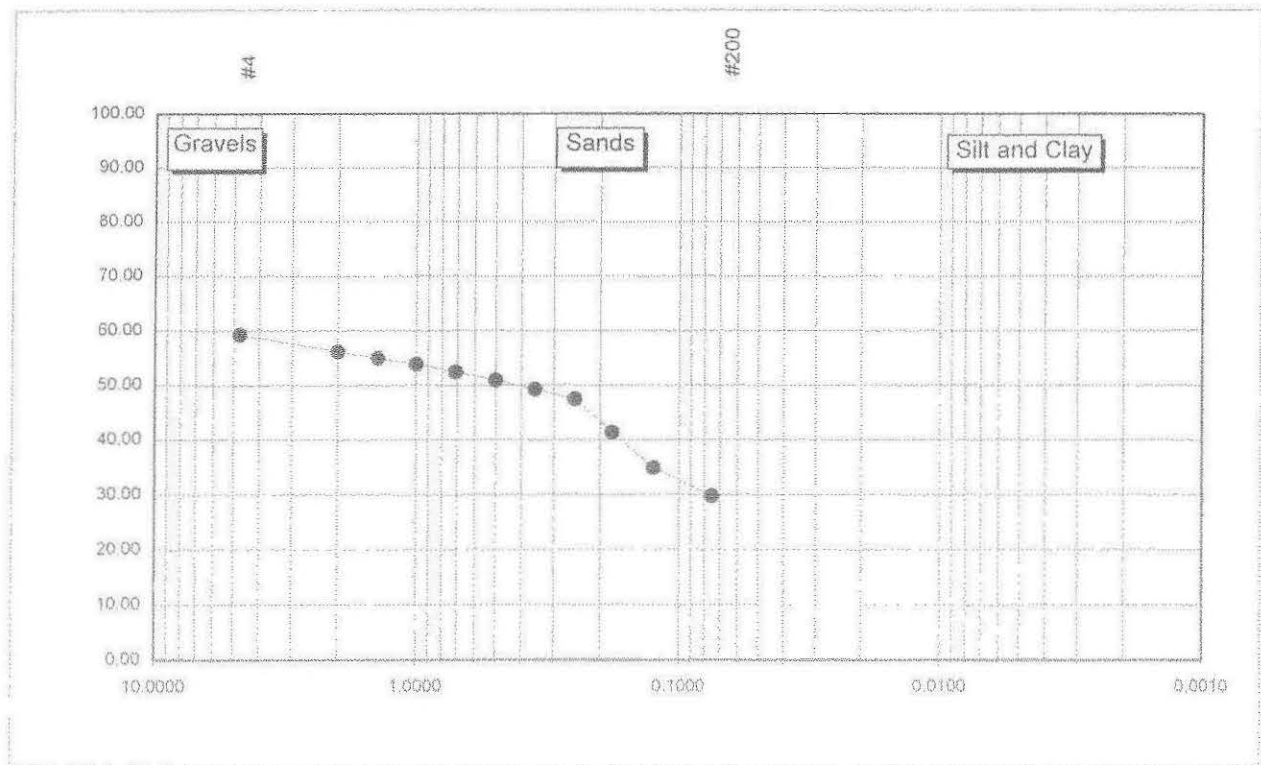
Location	Jacksonville Harbor
Boring No.	CB-JH99-16
Sample No.	2
Elev. of Sample (ft.):	-41.1 To -41.6
Date of Testing:	10-Dec-99
Est. Percent Shell:	<1%

Weight of Soil and Dish:	389.45
Dry Weight Soil and Dish:	275.40
Weight Dish:	8.51
Total Weight:	266.89
Weight Soil & Dish after Washing:	195.85
Weight of Oven Dry after Washing:	187.34

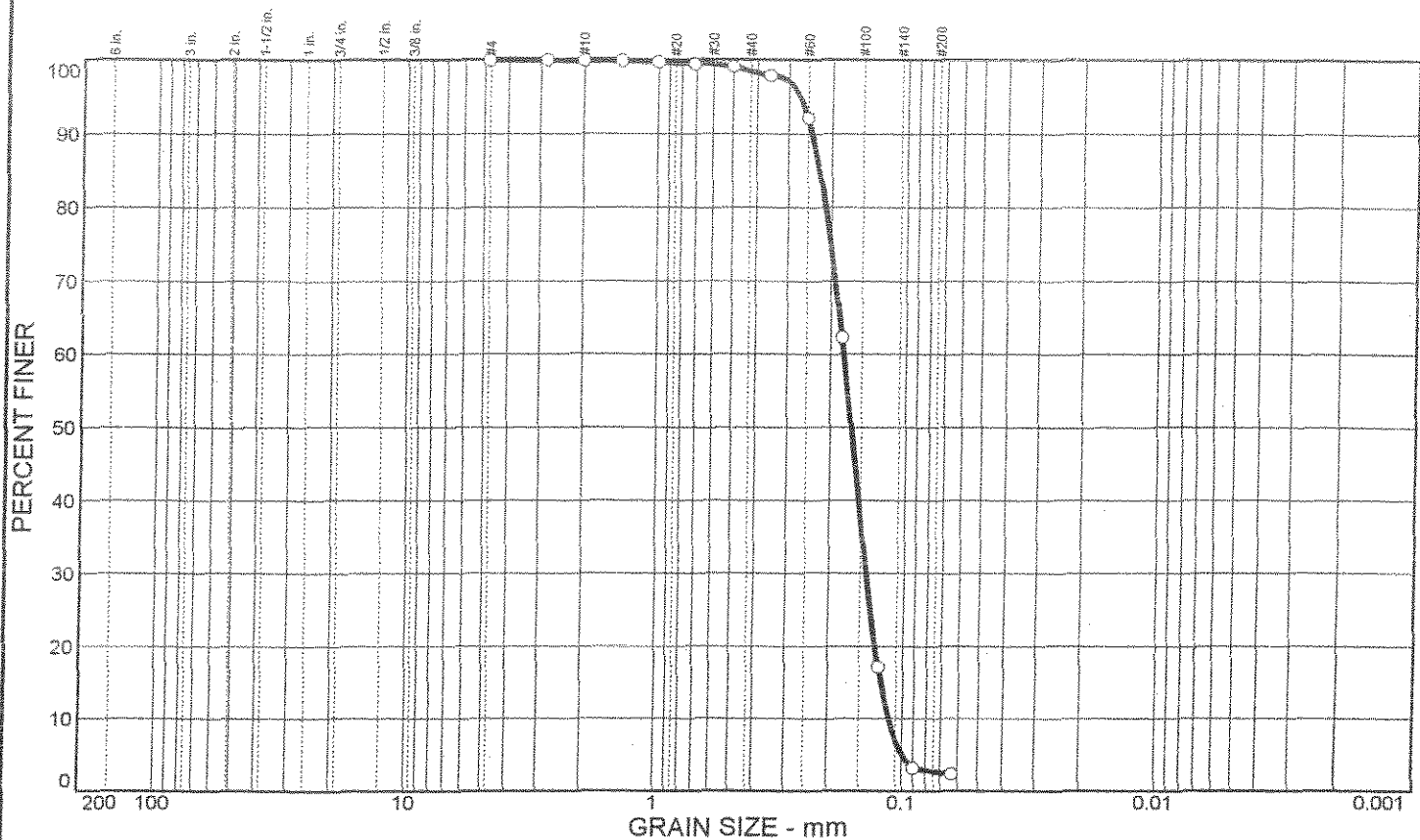
10% Passing - D10	
30% Passing - D30	0.080
60% Passing - D60	
Coef. Of Uniformity - Cu	
Coef. Of Curvature - Cc	
Classification:	SM

Sieve No.	Size (mm)	Individual Weight Retained	Cumulative Weight Retained	Cumulative Percent Retained	Cumulative Percent Finer Passing
#4	4.7500	108.95	108.95	40.82	59.18
#10	2.0000	8.10	117.05	43.86	56.14
#14	1.4000	3.26	120.31	45.08	54.92
#18	1.0000	2.96	123.27	46.19	53.81
#25	0.7100	3.70	126.97	47.57	52.43
#35	0.5000	4.22	131.19	49.16	50.84
#45	0.3550	4.33	135.52	50.78	49.22
#60	0.2500	4.74	140.26	52.55	47.45
#80	0.1800	16.35	156.61	58.68	41.32
#120	0.1250	17.01	173.62	65.05	34.95
#200	0.0750	13.72	187.34	70.19	29.81
Pan		0.00	266.89	100.00	0.00

- Notes:
1. All weights in grams
 2. Total weight equals oven dry weight of grain size sample.



Grain Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
0		97.3	2.7		SP	A-3		

SIEVE inches size	PERCENT FINER			SIEVE number size	PERCENT FINER			SOIL DESCRIPTION
	○				○			
				#4	100.0			○ SAND, fine quartz, gray-brown
				#7	100.0			
				#10	99.9			
				#14	99.9			
				#18	99.7			
				#25	99.5			
				#35	99.1			
				#45	97.9			
				#60	92.1			
				#80	62.3			
				#120	17.1			
				#170	3.2			
				#230	2.3			
								REMARKS: ○ Depth 40-40.5

○ Source: CB JH00-3



Sample No.: 1

Law Engineering and Environmental Services, Inc.	Client: US Army Corp of Engineers
	Project: Jacksonville Harbor
	Project No.: 40521-8-8051-28

Grain size distribution curve showing Percent Finer versus Grain Size (mm). The curve is plotted on a semi-logarithmic scale, with the x-axis (Grain Size) ranging from 200 mm to 0.001 mm and the y-axis (Percent Finer) ranging from 0 to 100. The curve shows a sharp drop in percent finer between 0.425 mm and 0.075 mm, indicating a well-graded material.

Grain Size (mm)	Percent Finer (%)
200	100
100	100
60	100
40	100
30	100
20	100
10	100
7.5	100
6	100
4.75	100
4.25	100
3.75	100
3.0	100
2.5	100
2.0	100
1.5	100
1.18	100
1.0	100
0.85	100
0.75	100
0.6	100
0.425	100
0.375	95
0.30	90
0.25	71
0.20	60
0.15	28
0.125	15
0.10	11
0.075	10
0.06	8
0.05	8

[illegible]

SIEVE Inches size	PERCENT FINER		
	○		
	GRAIN SIZE		
D ₆₀	0.164		
D ₃₀	0.129		
D ₁₀	0.0881		
	COEFFICIENTS		
C _c	1.15		
C _u	1.86		

SIEVE number size	PERCENT FINER	
	○	
#4	99.6	
#7	99.3	
#10	99.1	
#14	98.9	
#18	98.8	
#25	98.6	
#35	98.2	
#45	97.5	
#60	94.1	
#80	70.8	
#120	27.1	
#170	10.1	
#230	8.4	

○ SAND, fine quartz, trace silt,
light gray

REMARKS:

○ Depth 41.5-42.0

Source: CB JH00-3

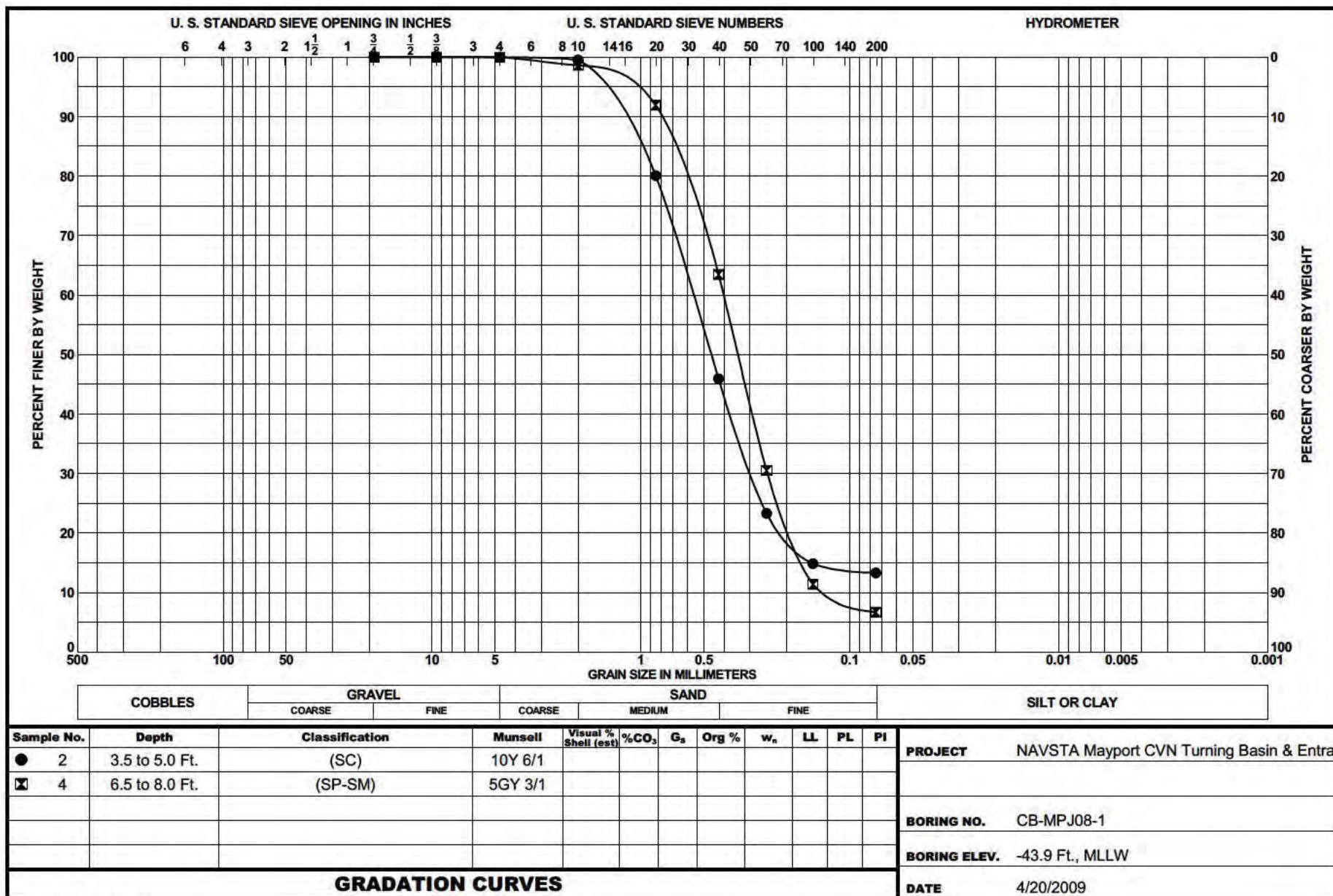
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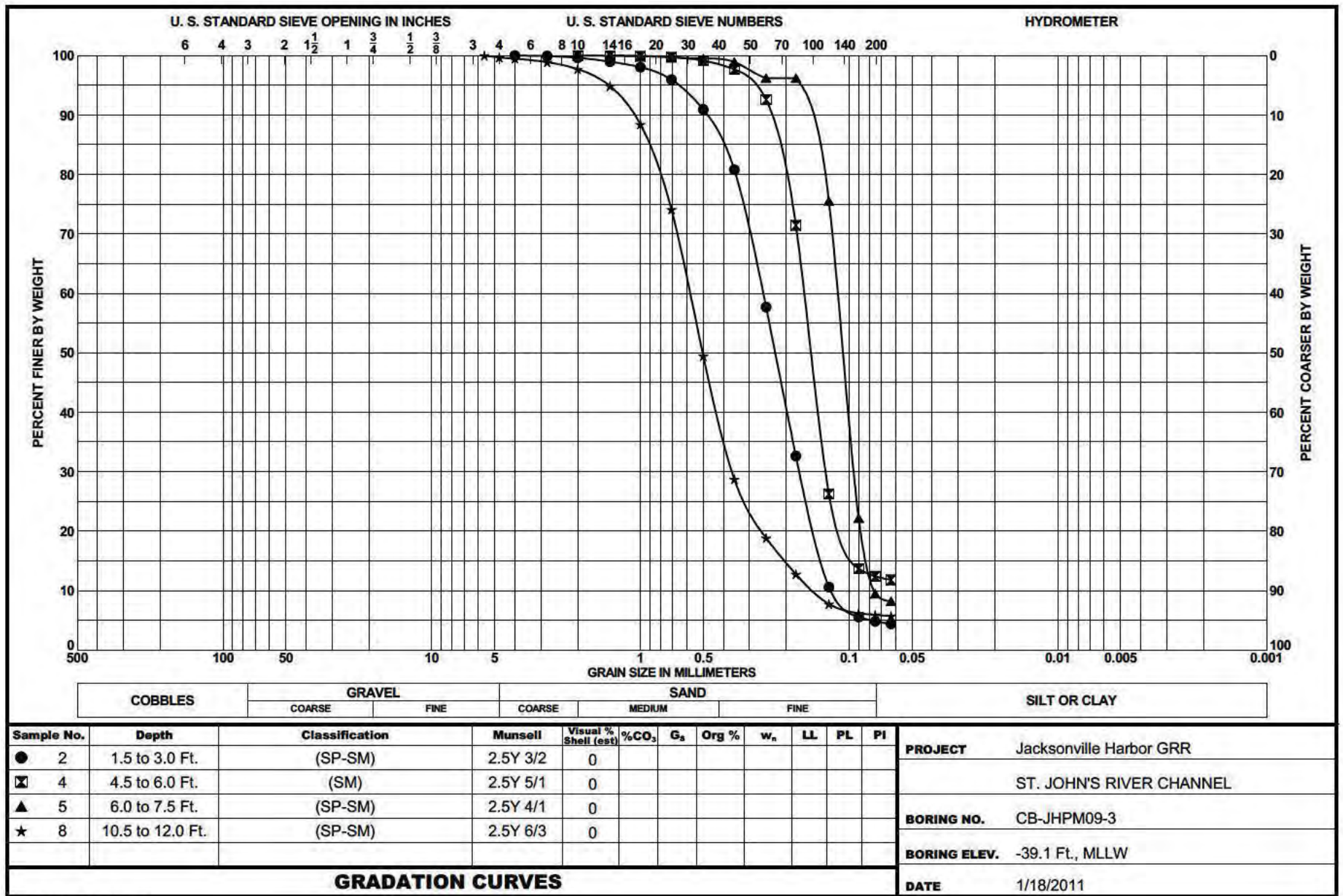
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Environmental Services, Inc.**

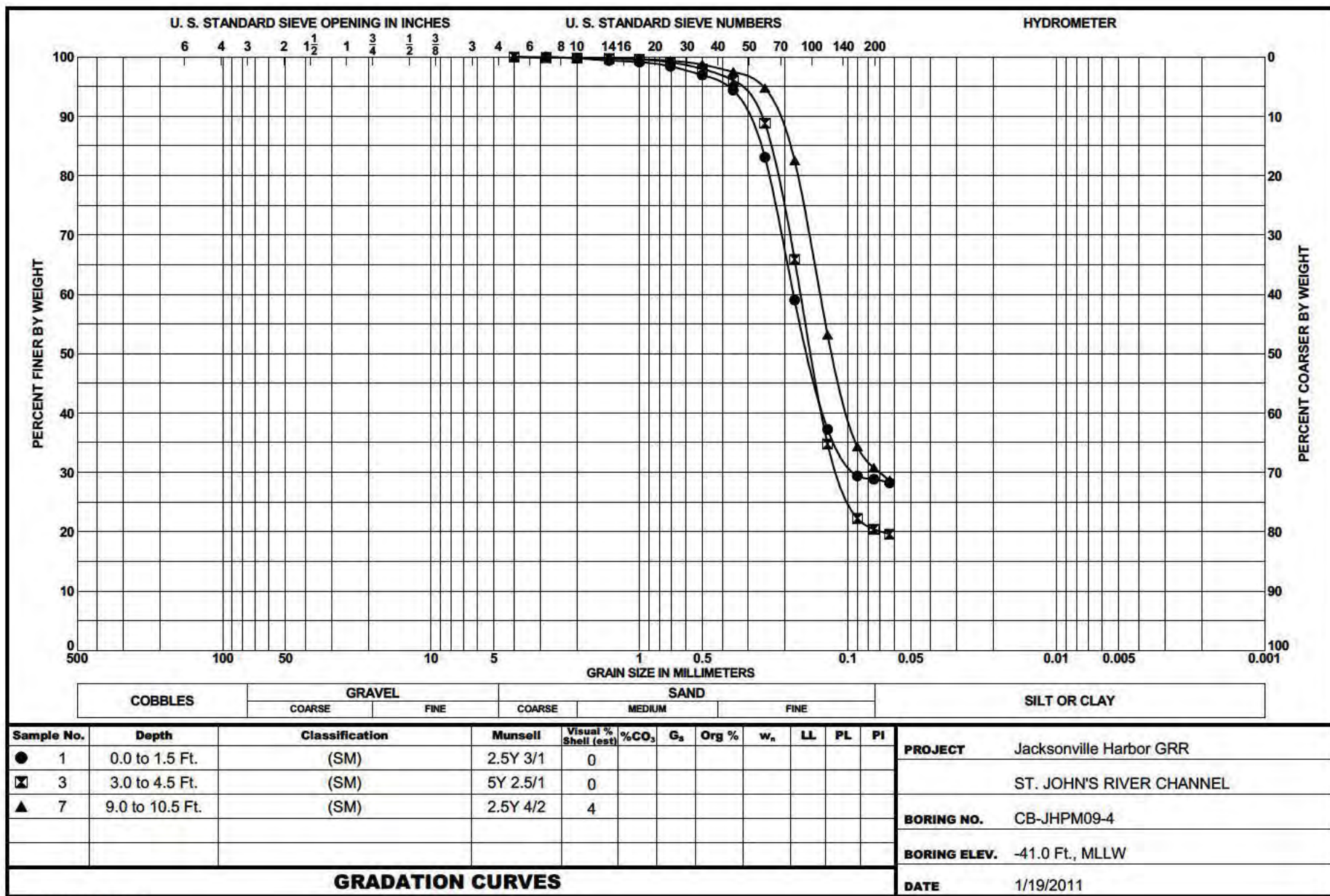
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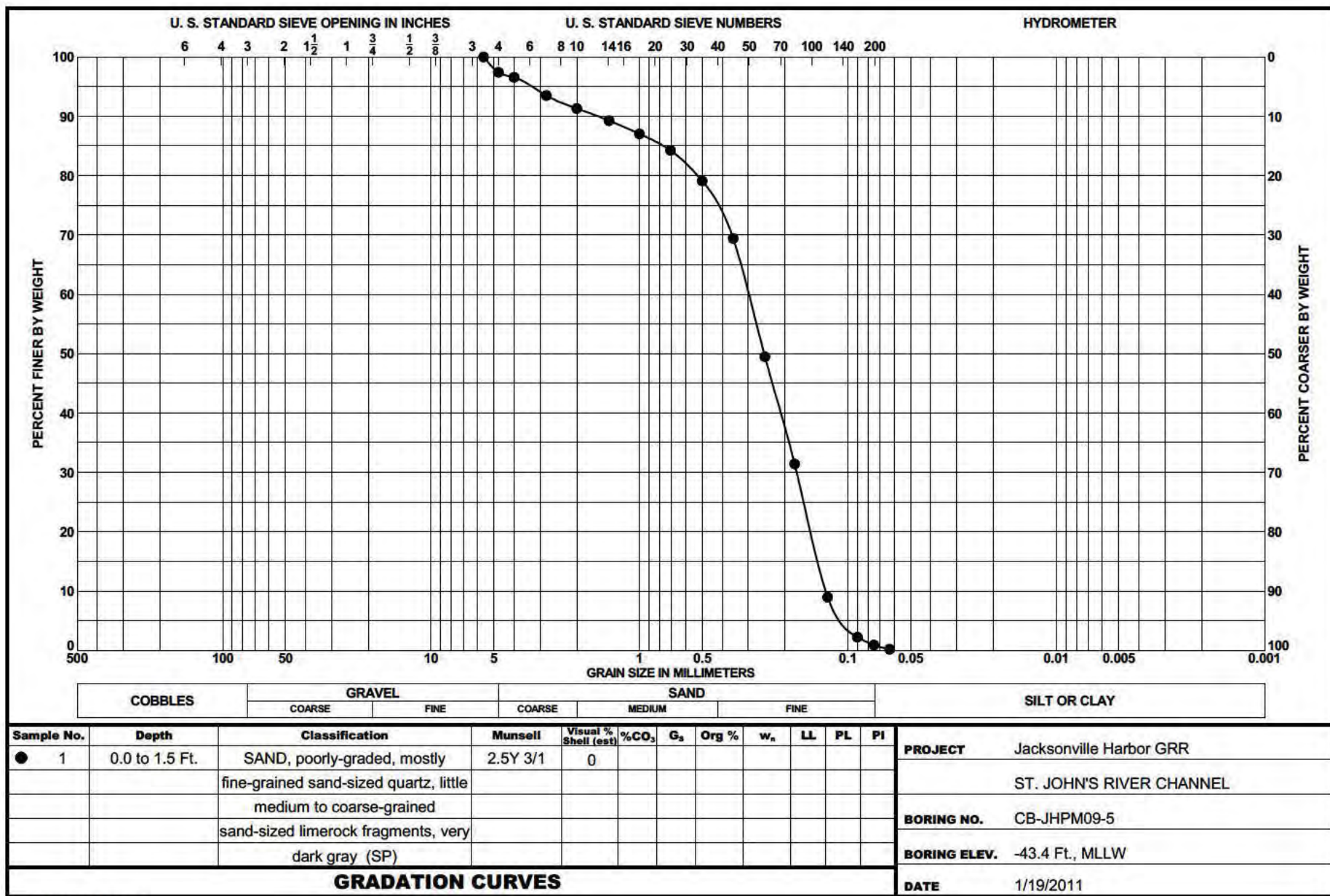
Project Jacksonville Harbor

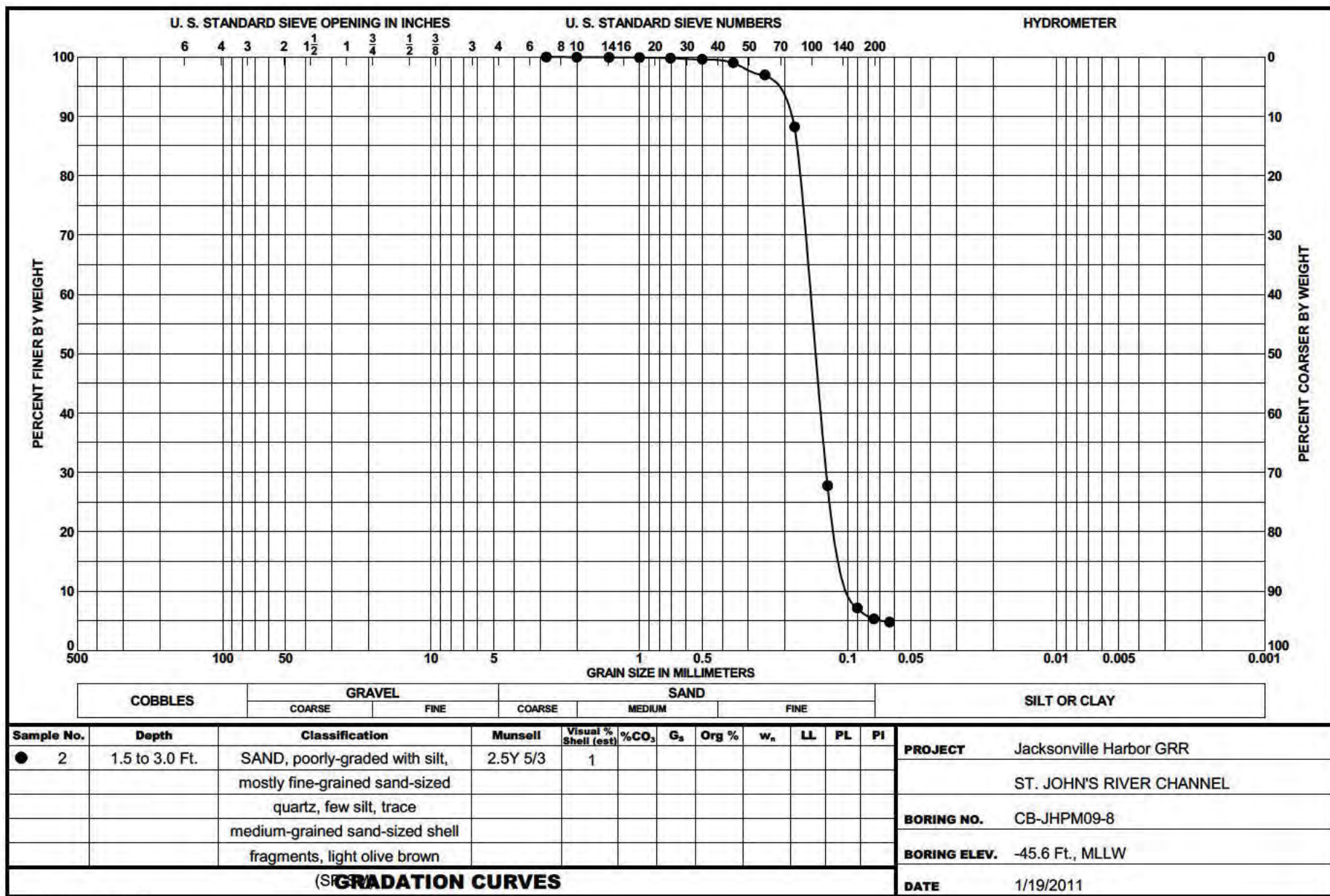
Project No.: 40521-8-8051-28

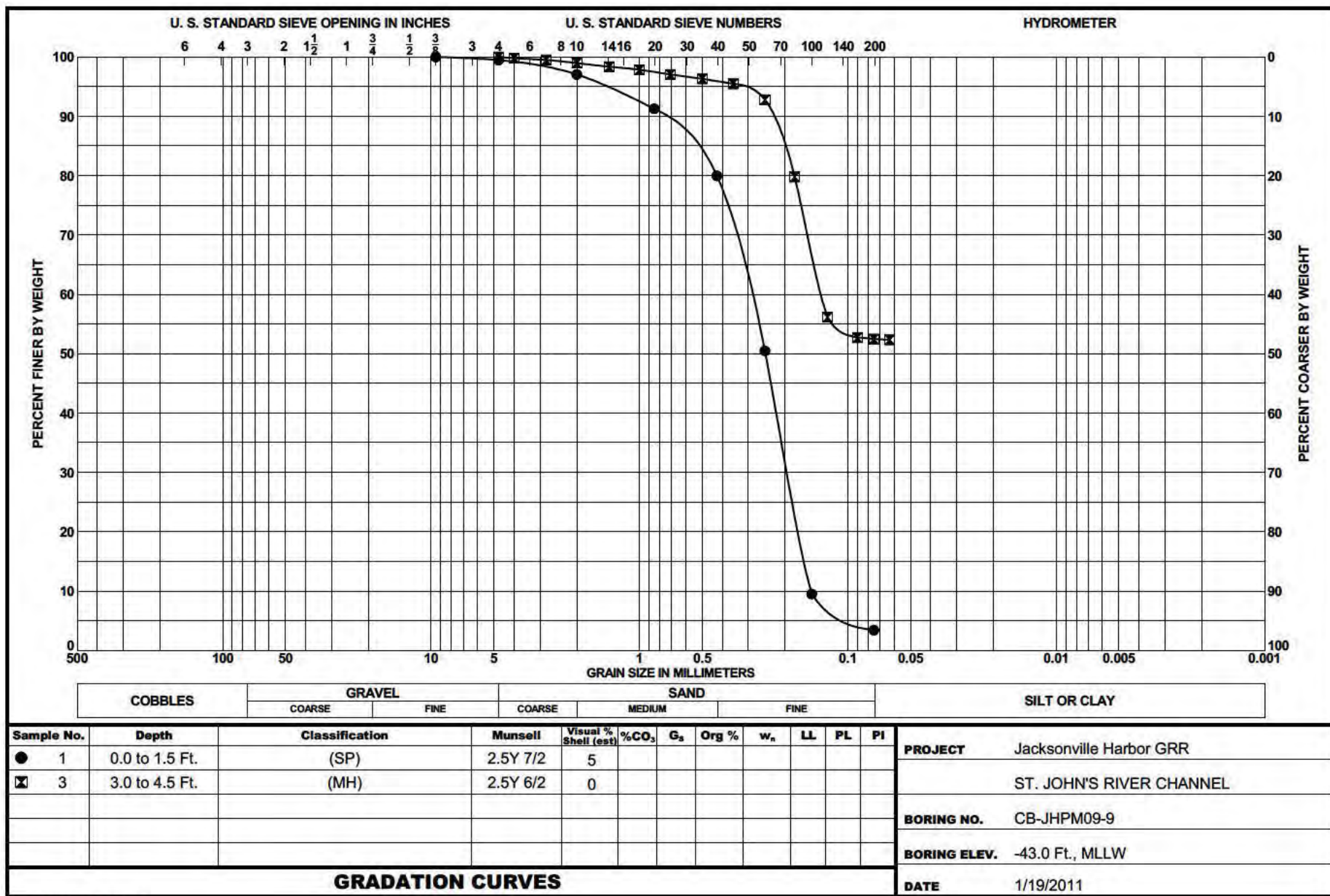


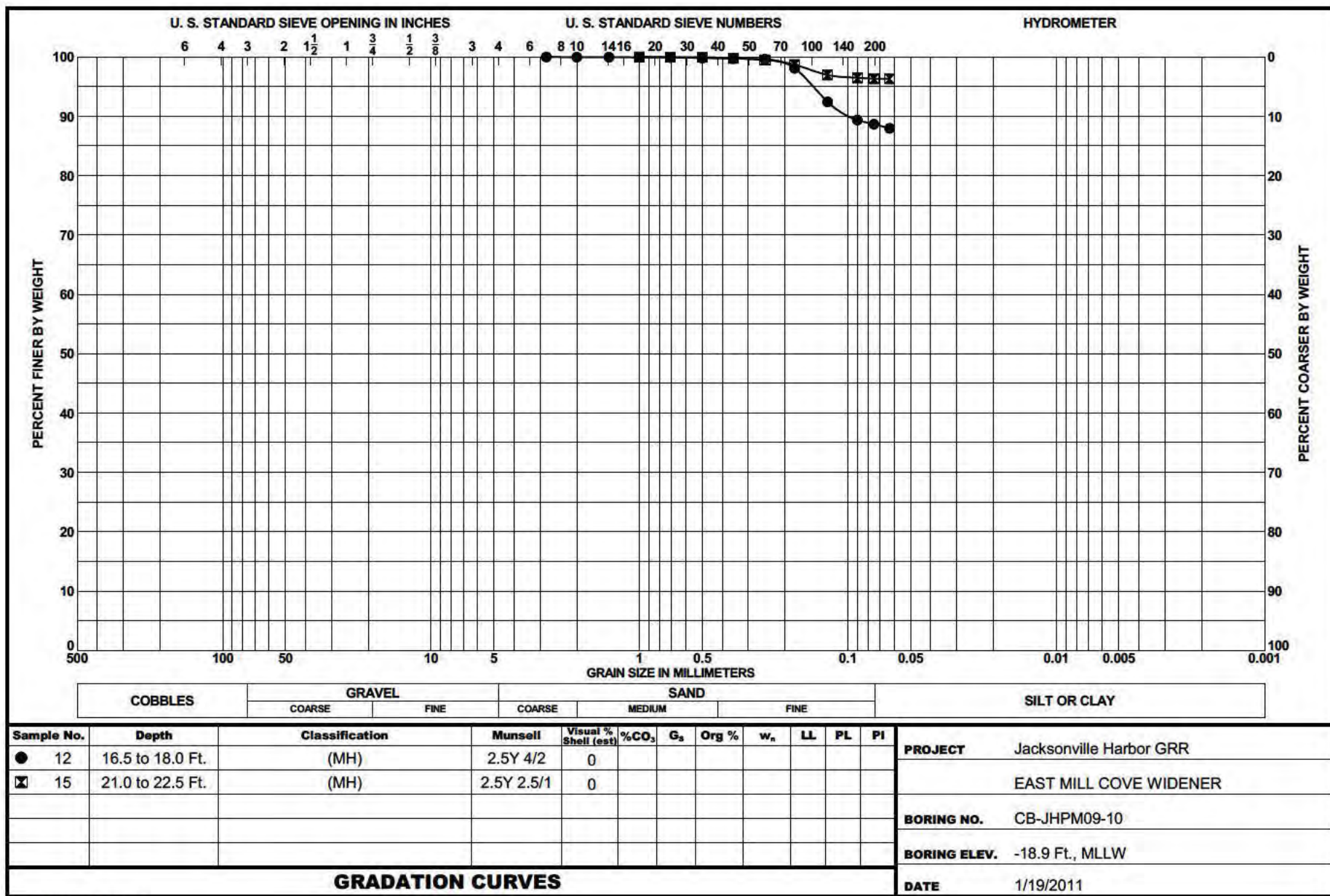


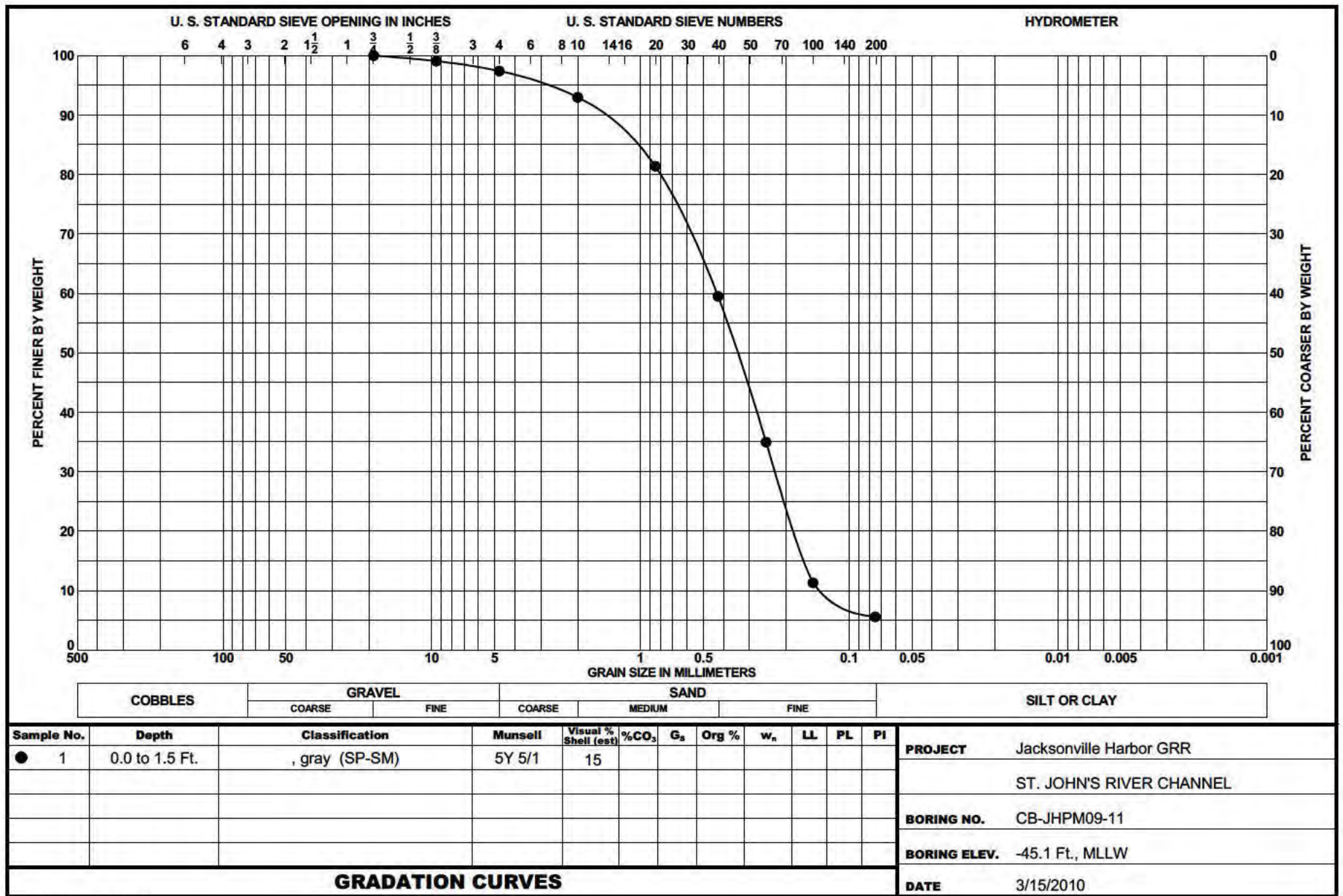


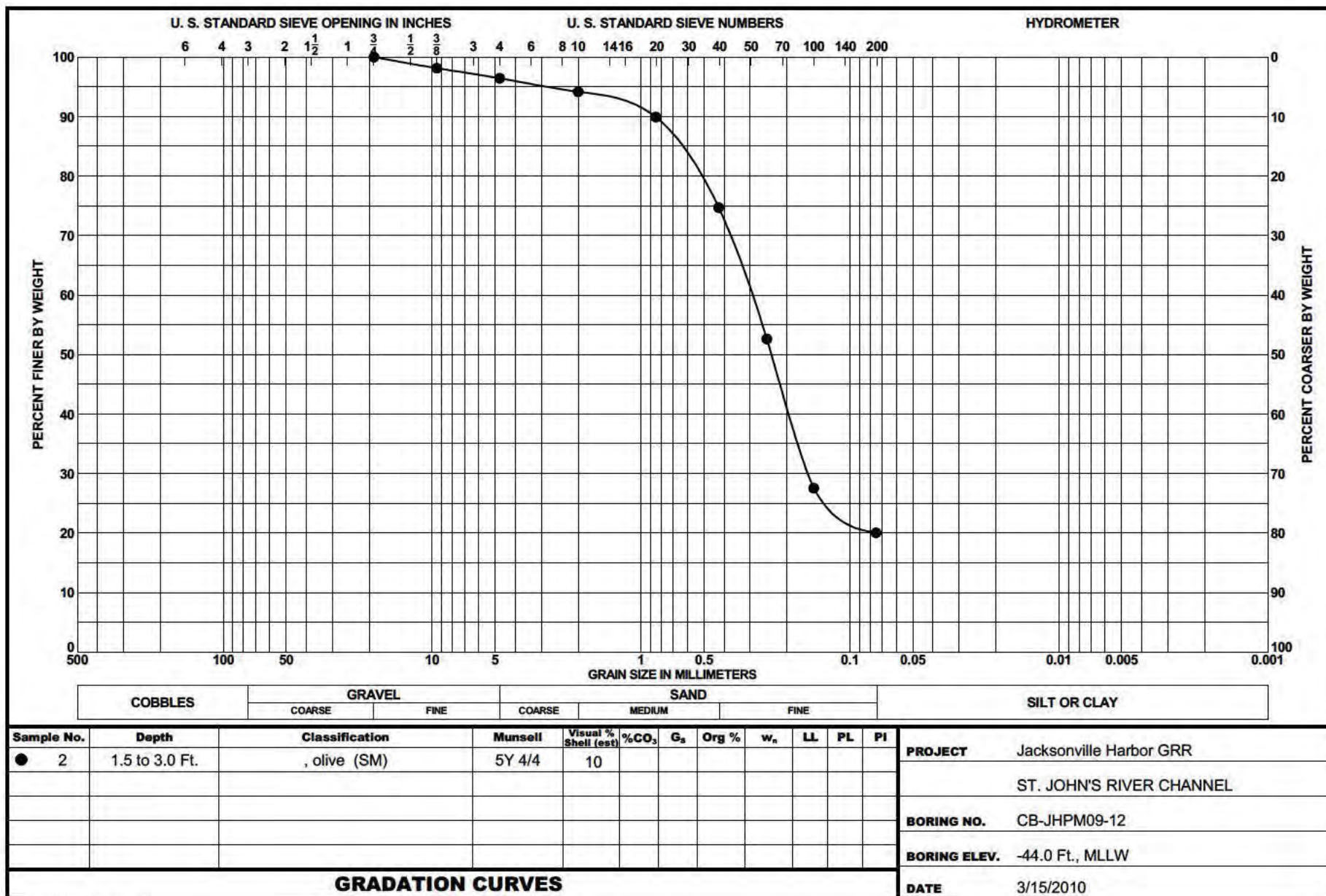


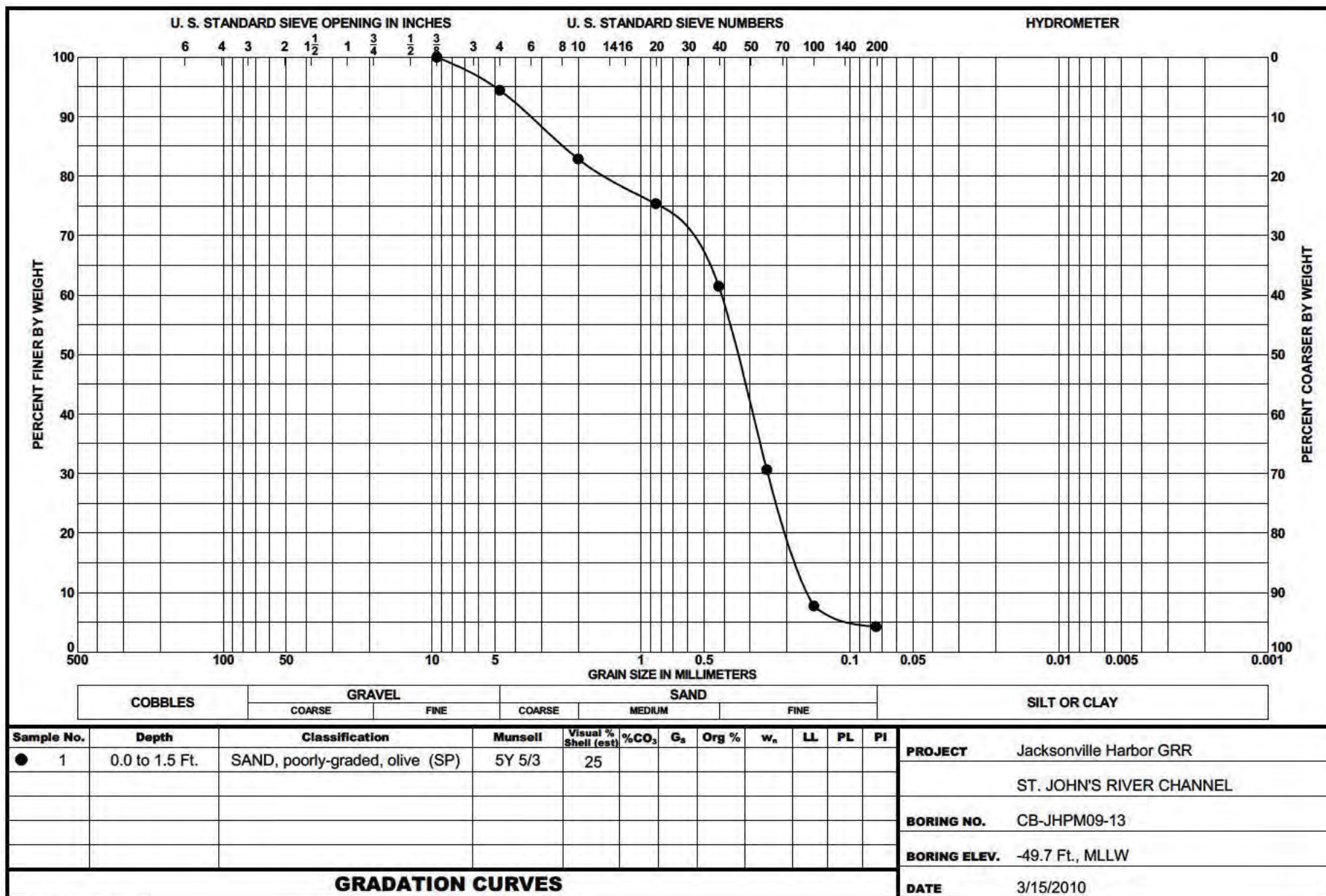




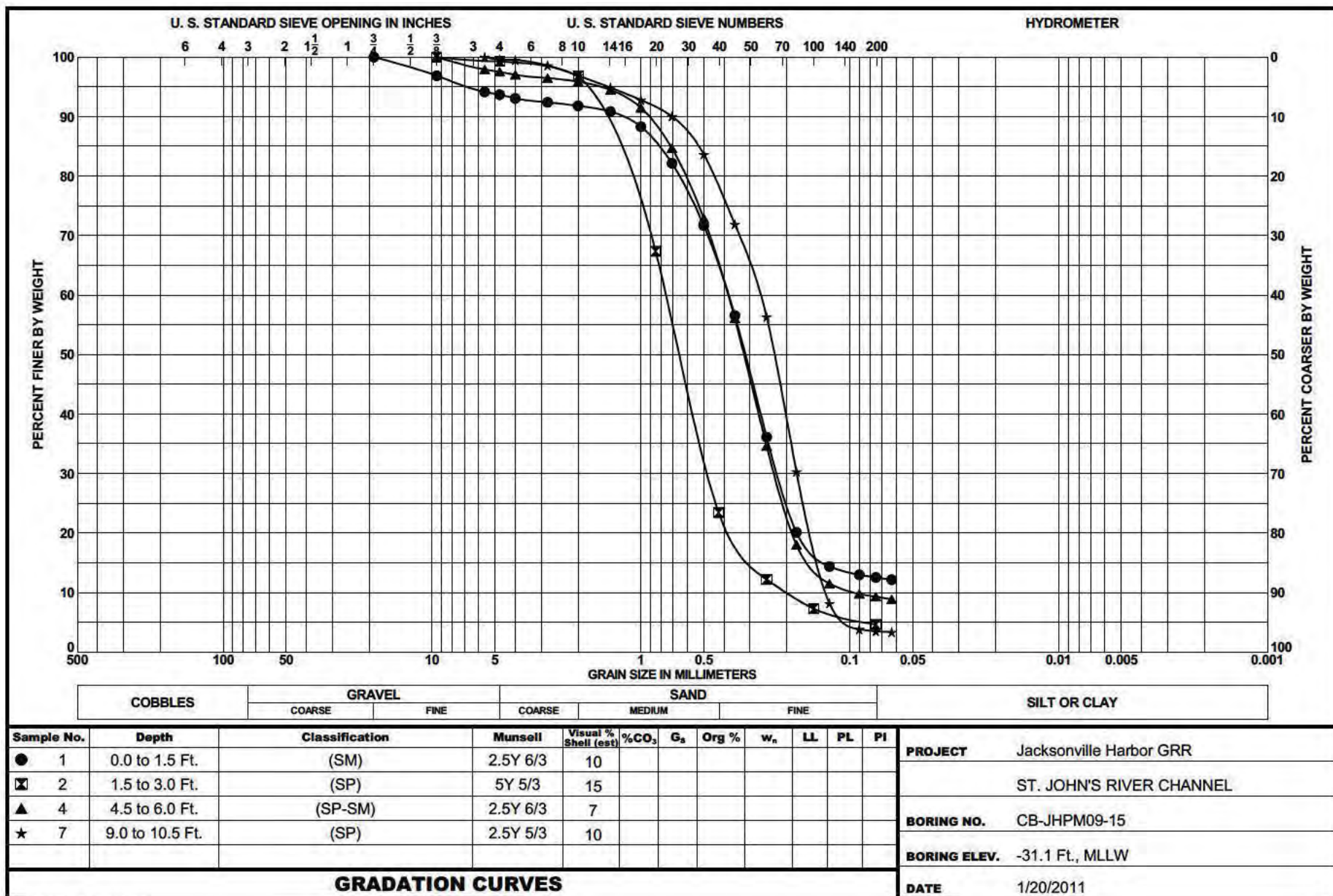


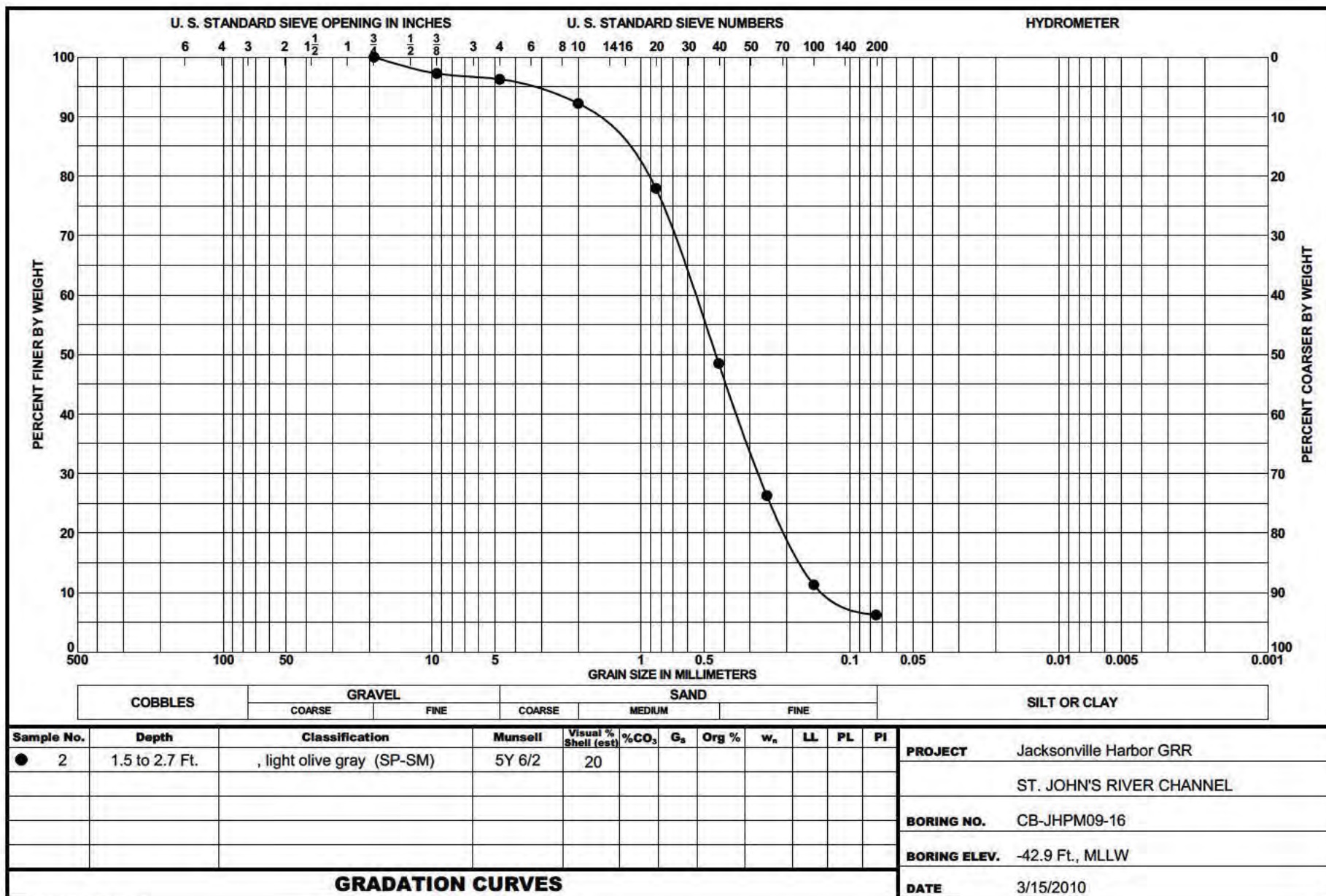


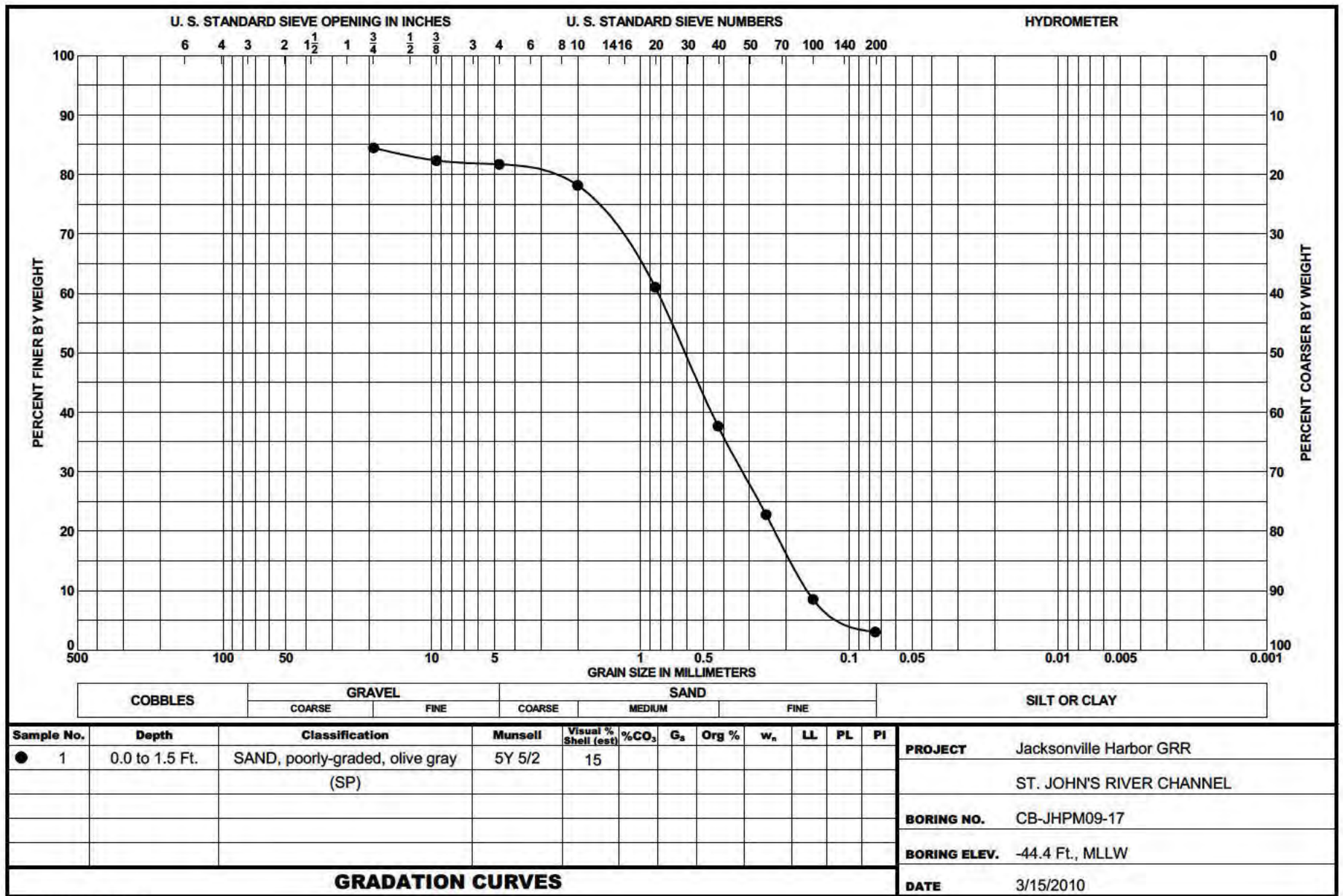




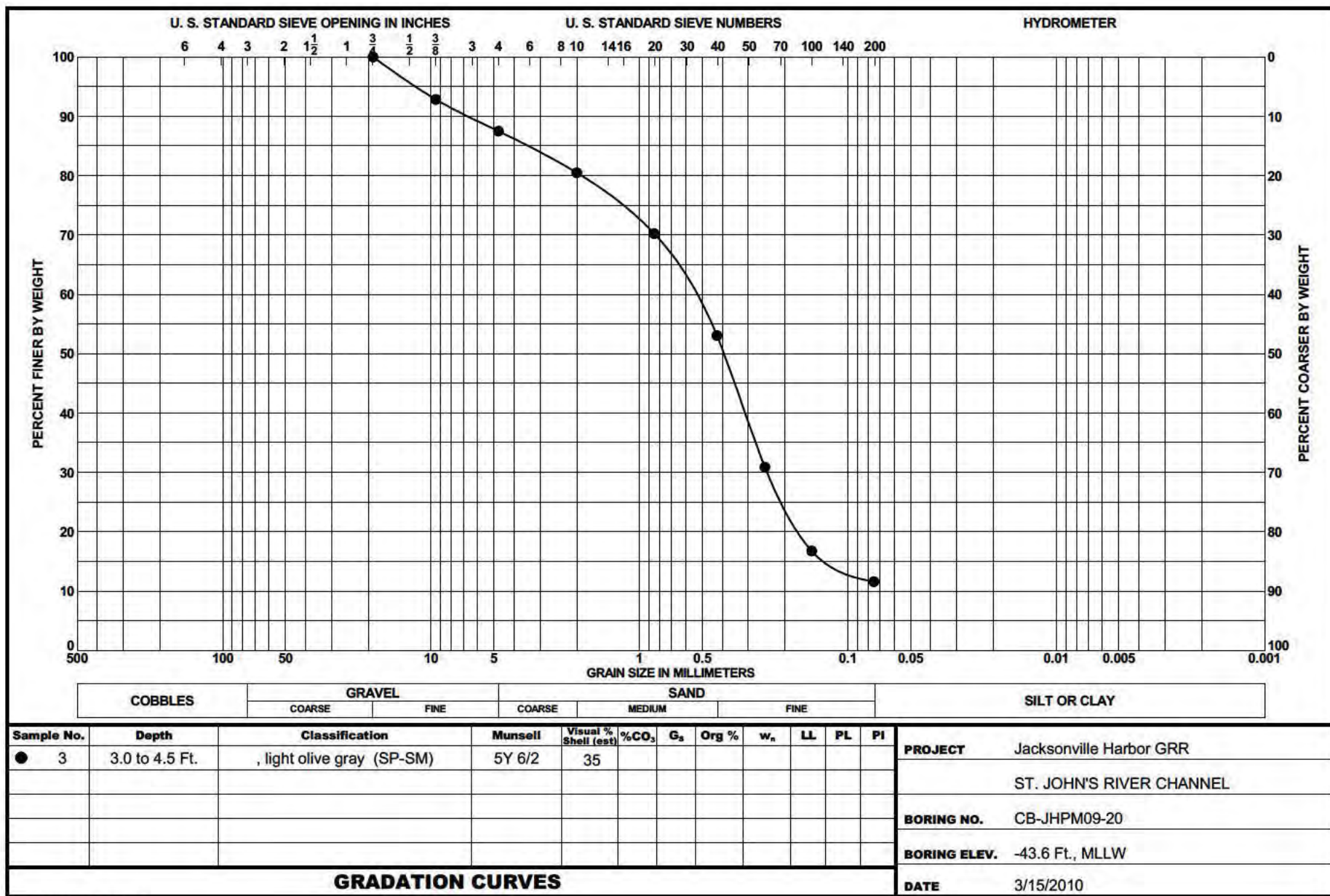


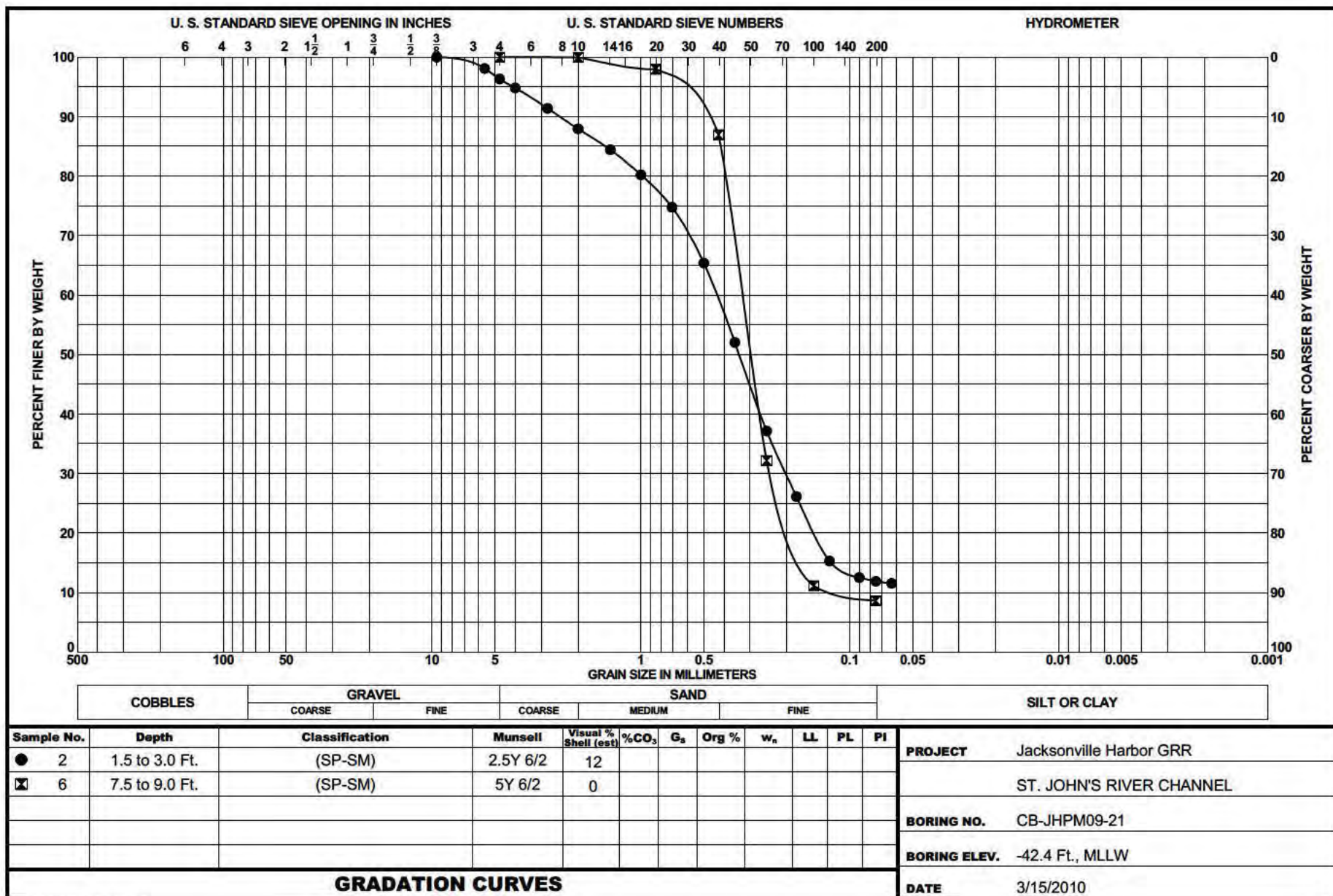






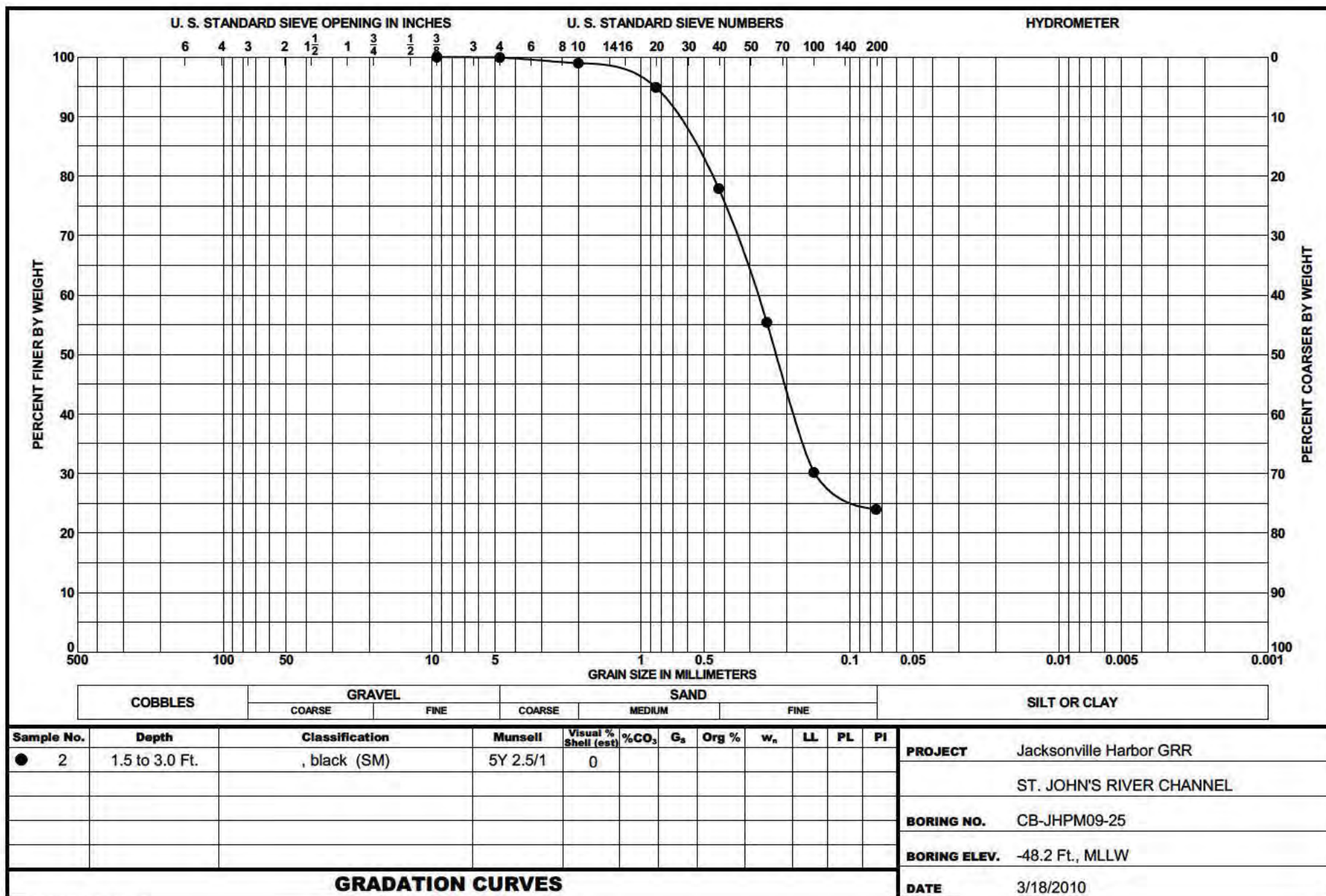


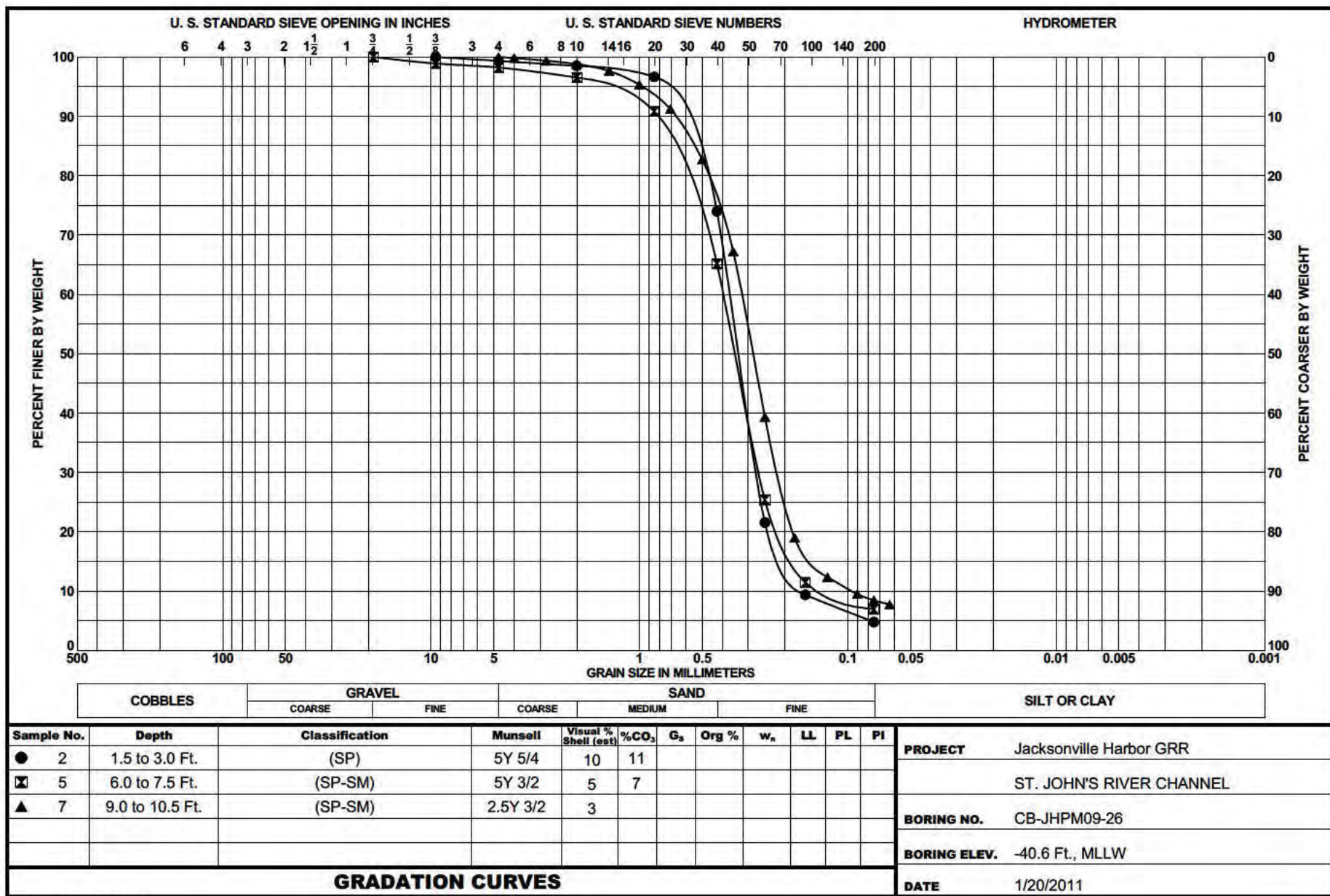




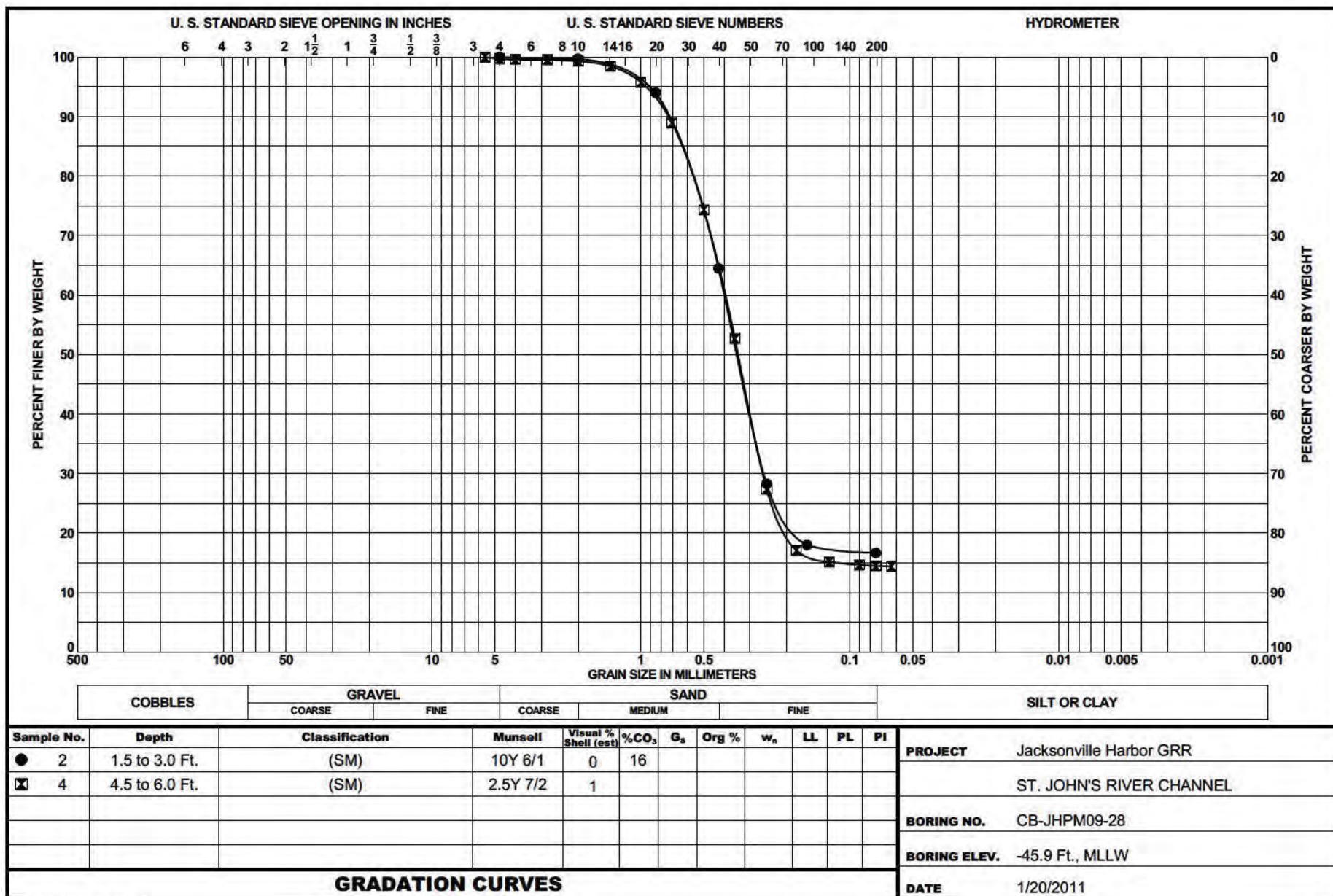


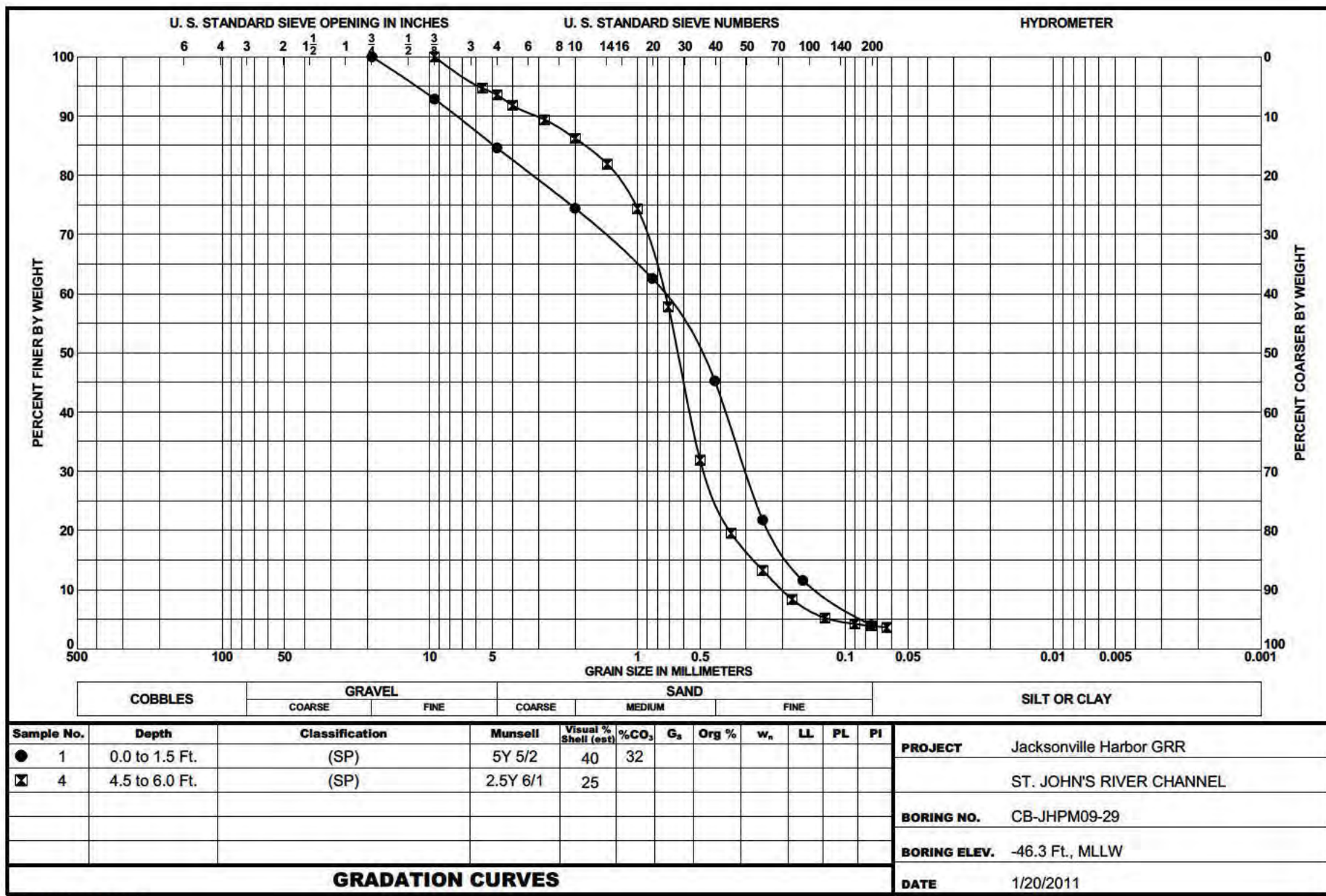


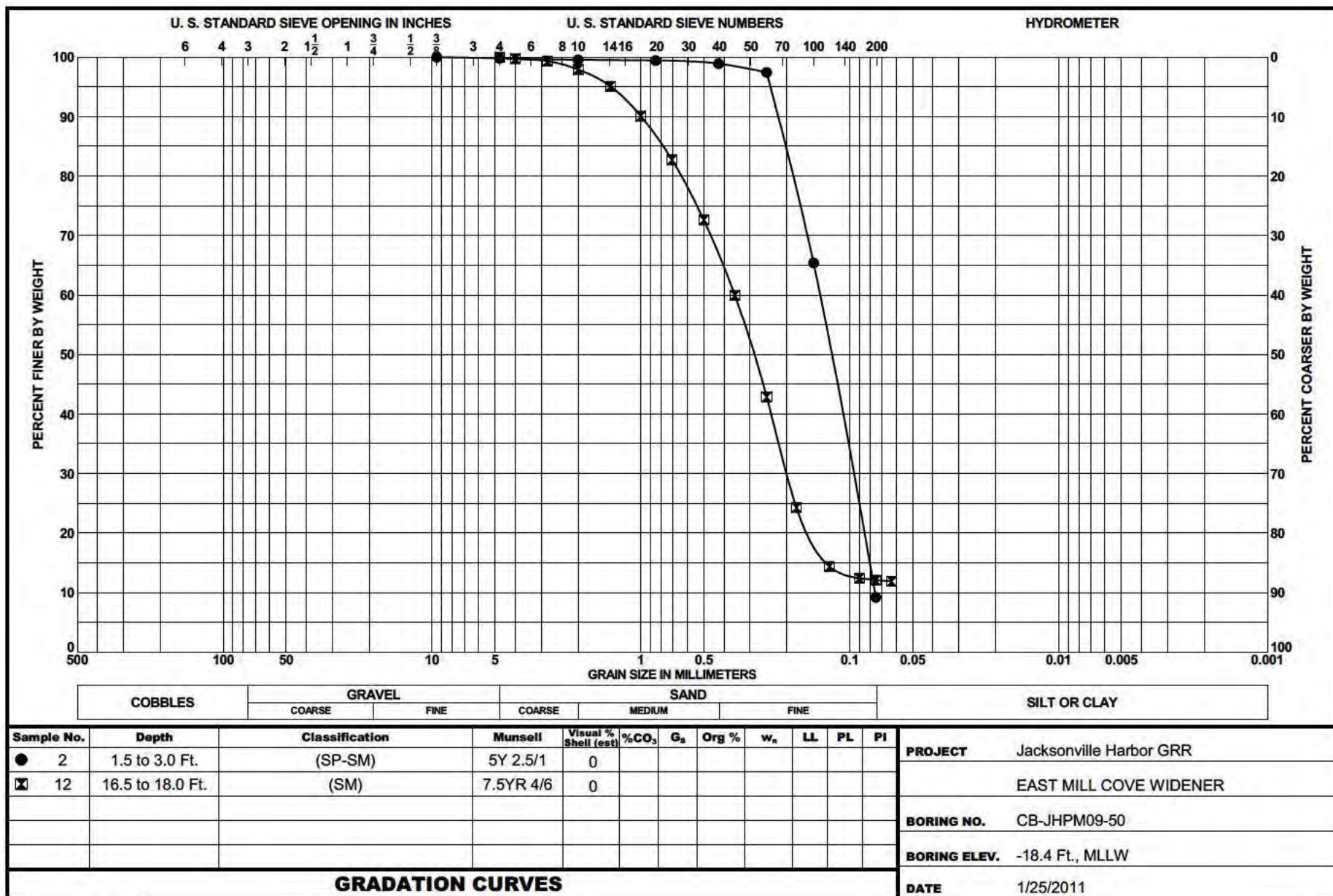




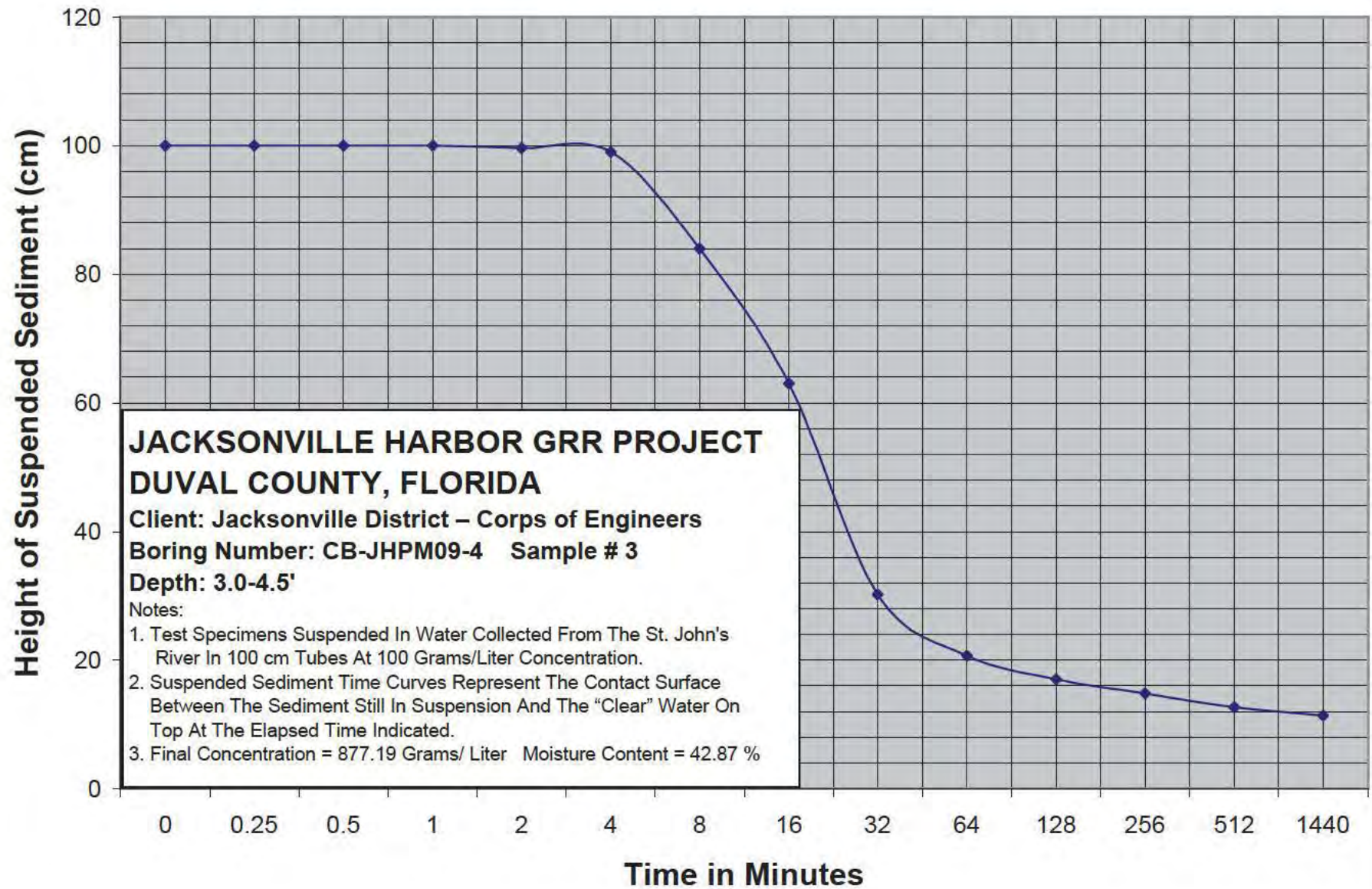




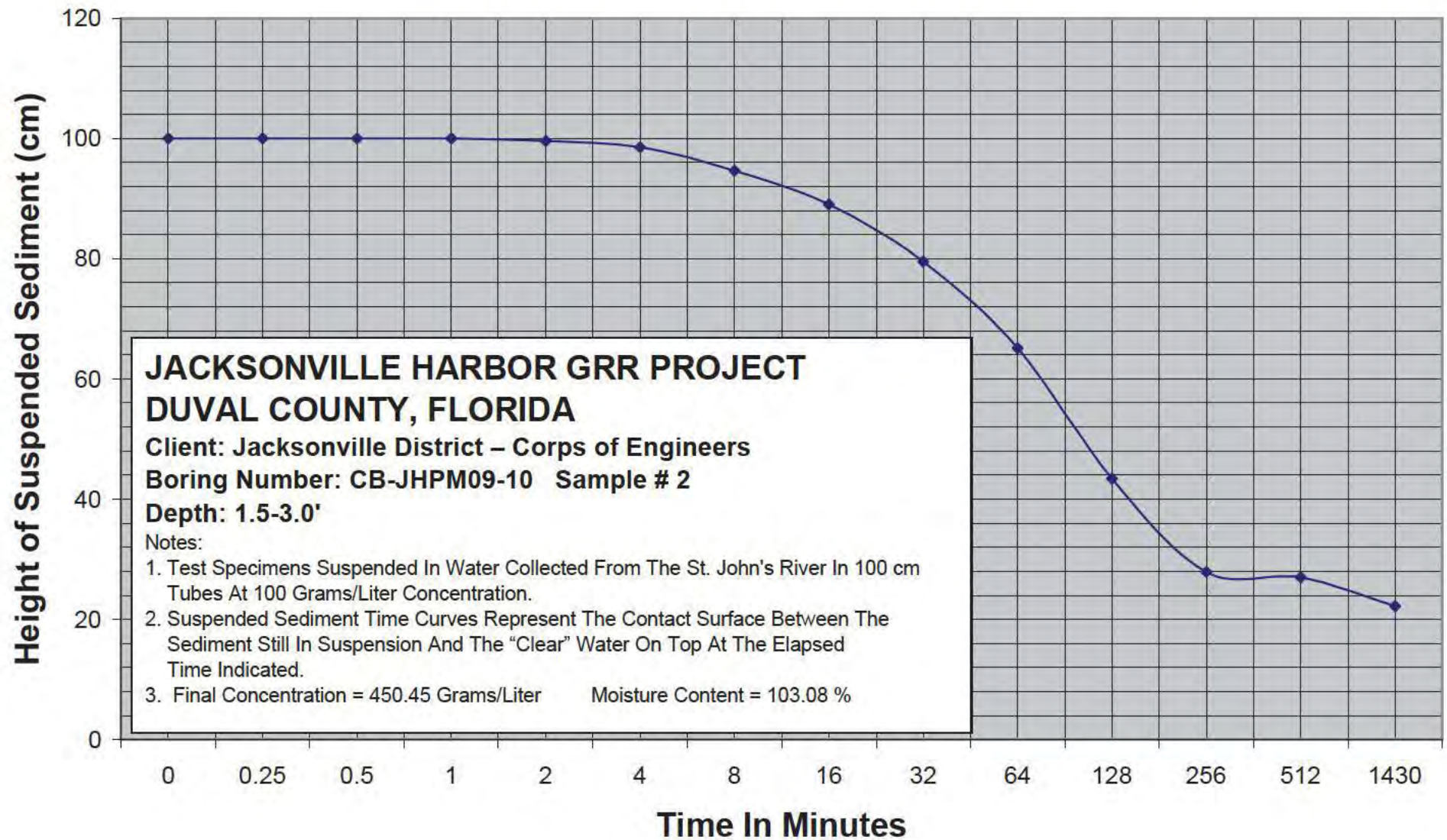




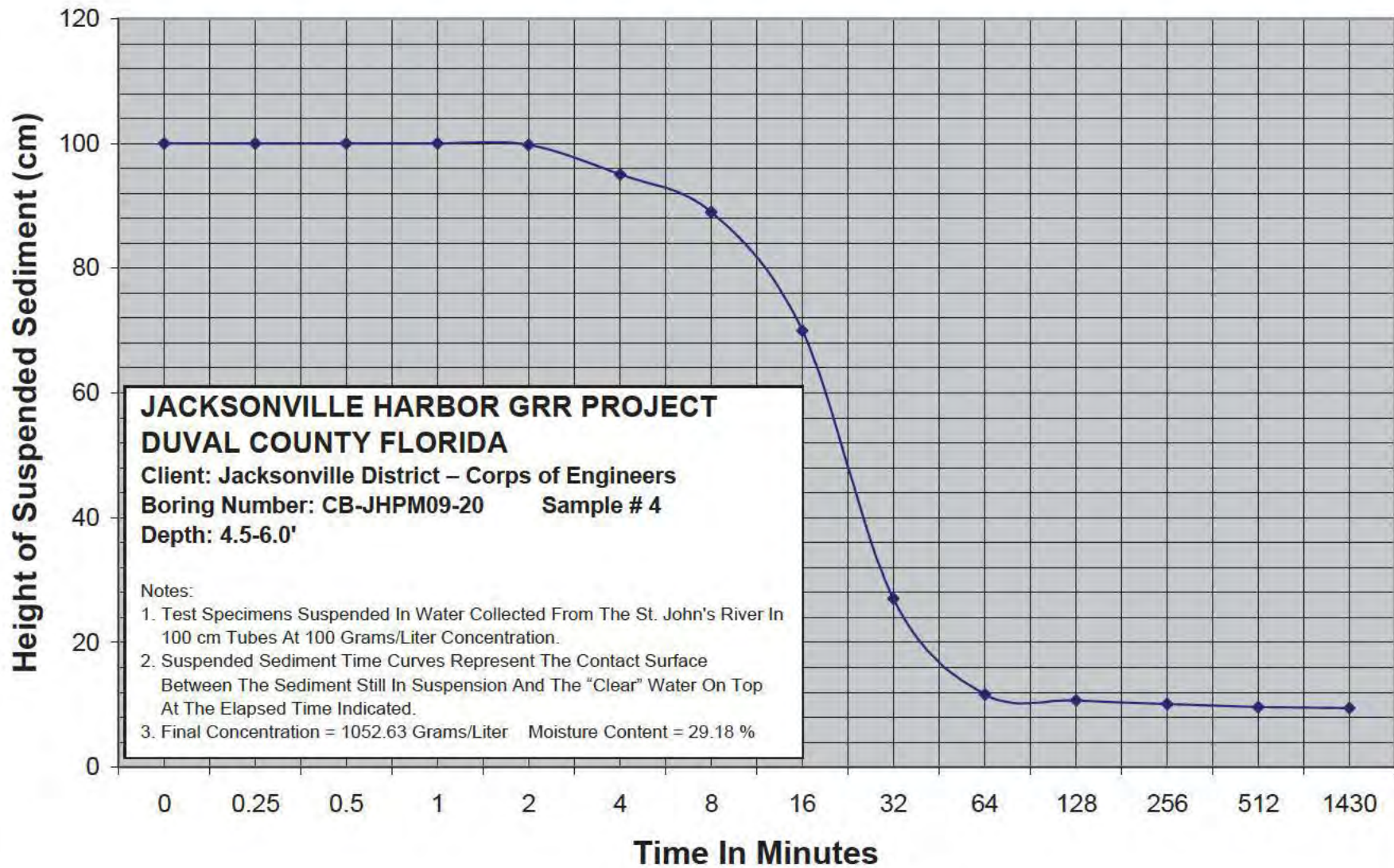
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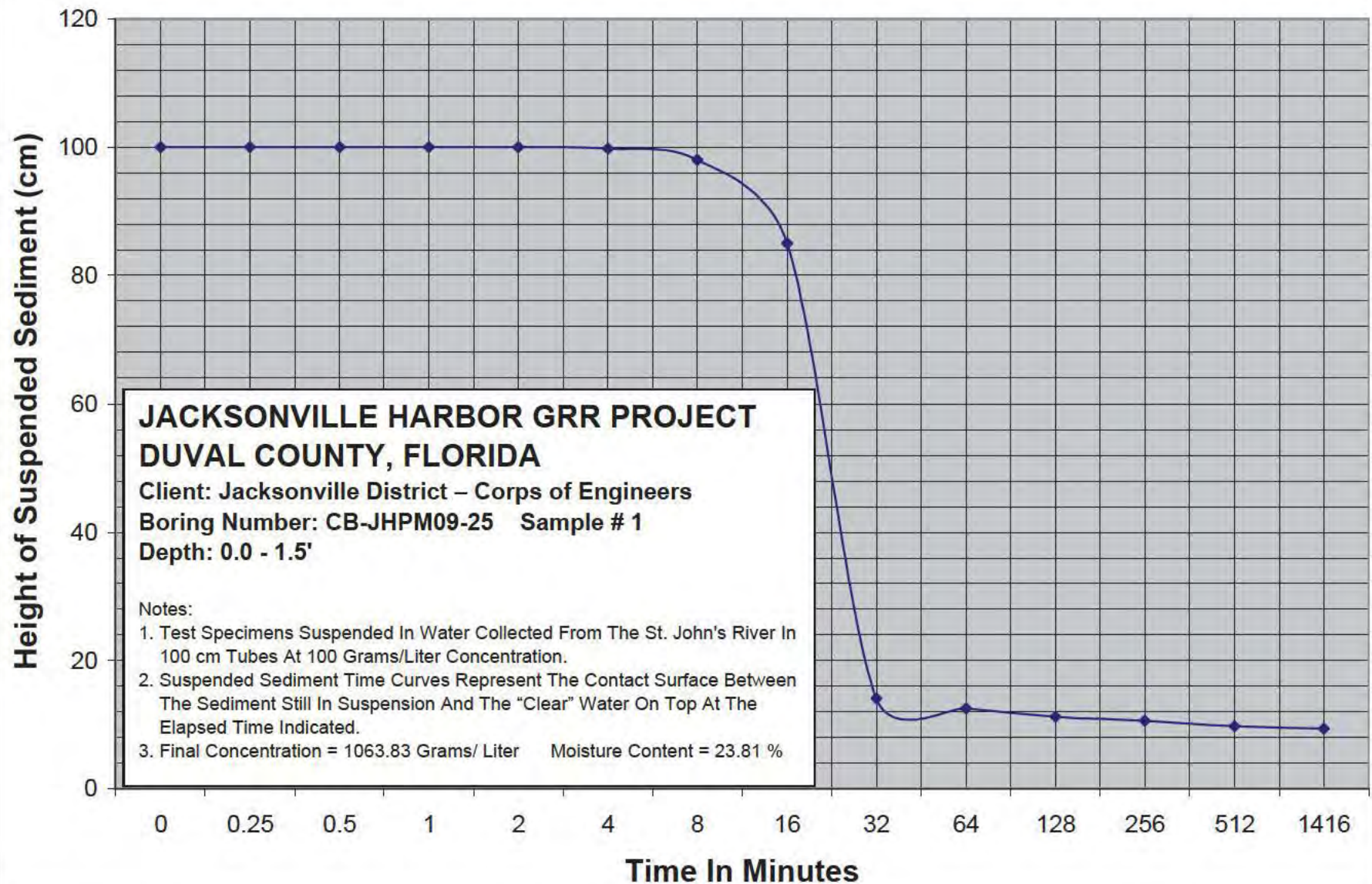
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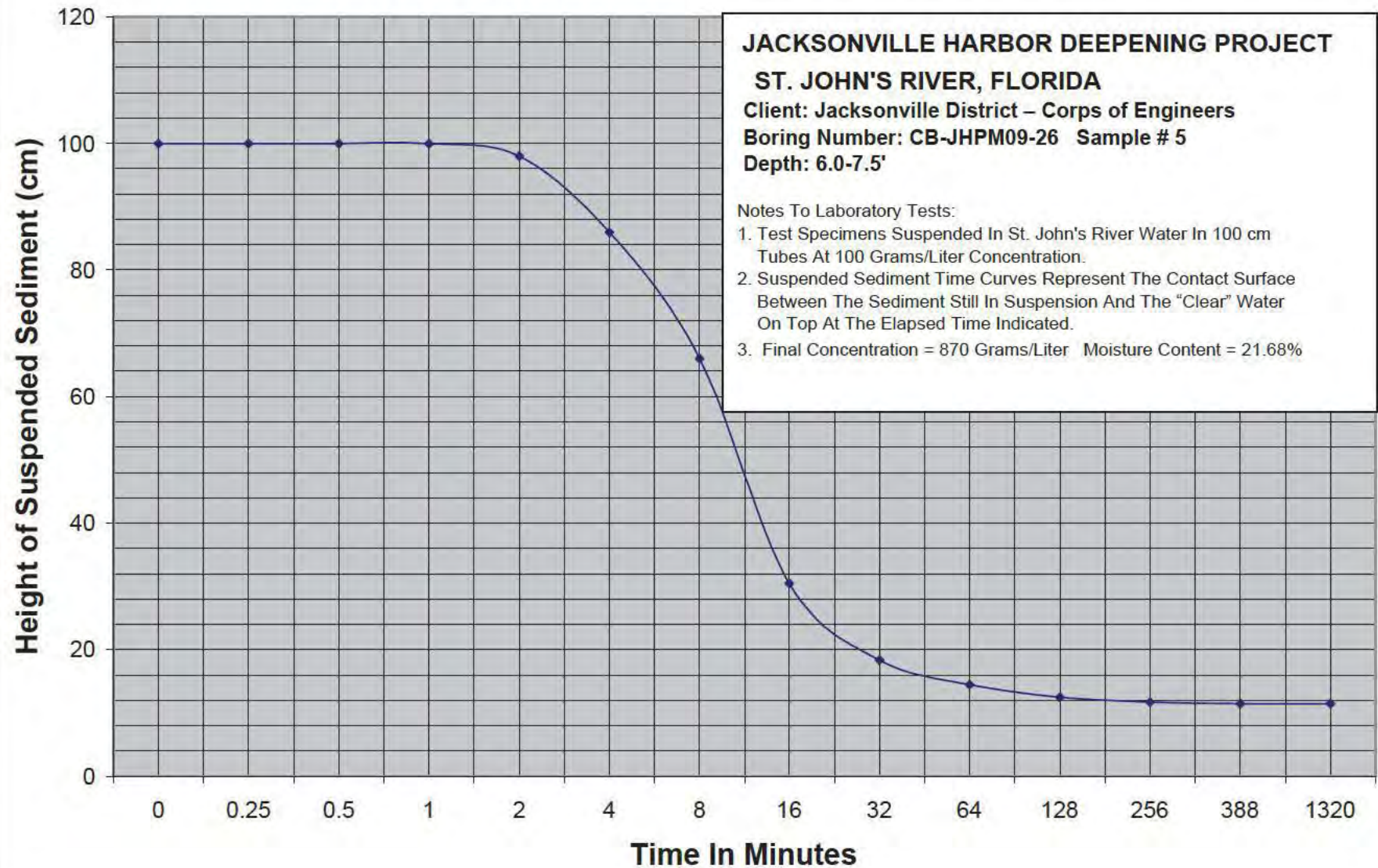
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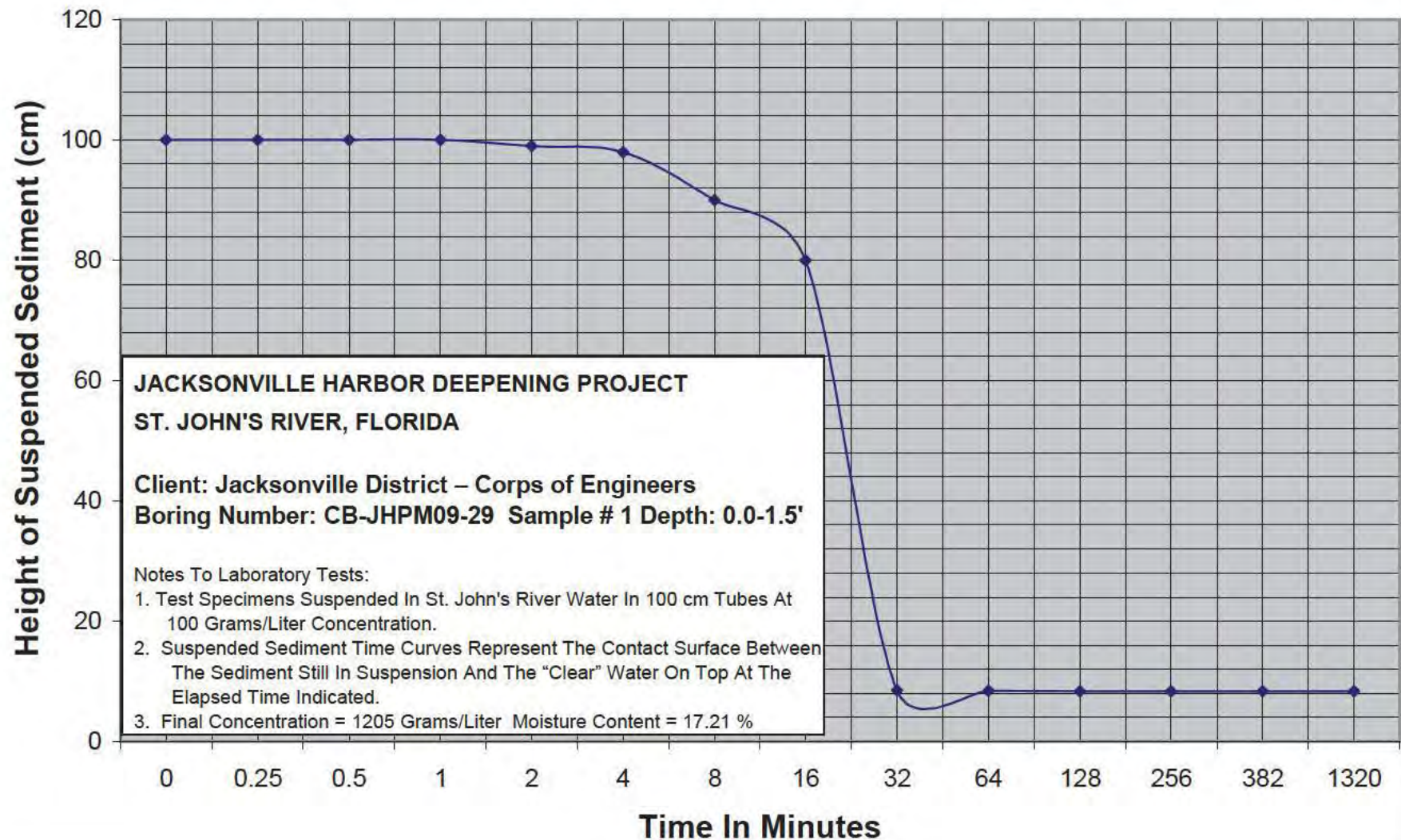
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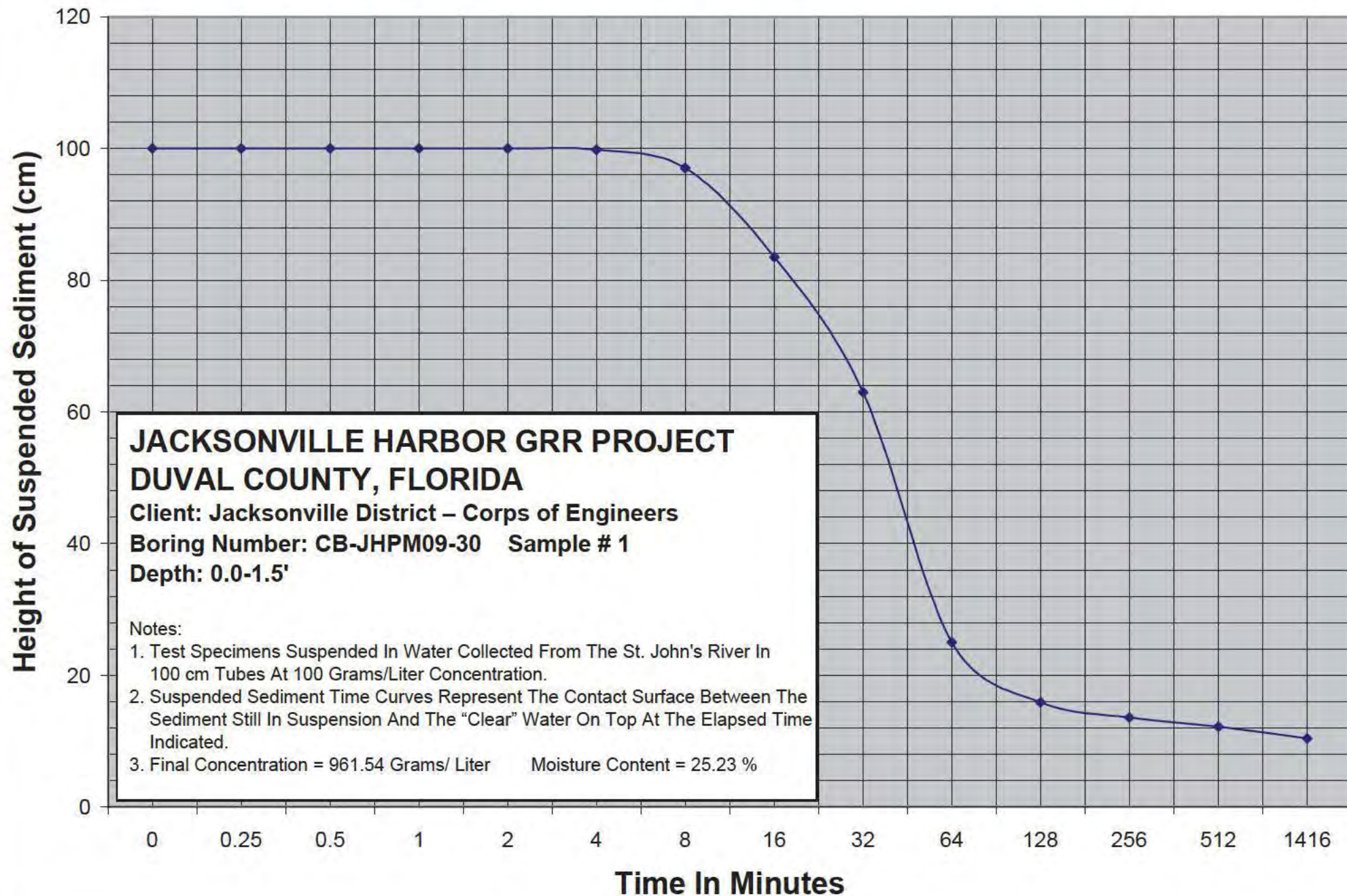
SUSPENDED SEDIMENTATION TIME CURVES



SUSPENDED SEDIMENTATION TIME CURVES



SUSPENDED SEDIMENTATION TIME CURVES



COMPRESSIVE STRENGTH OF ROCK CORE SAMPLES

ASTM D2938

JACKSONVILLE HARBOR GRR PROJECT JACKSONVILLE DISTRICT - US ARMY CORPS OF ENGINEERS

CORE BORING NUMBER	DEPTH (FT.)	ELEVATION (MLLW)	RUN #	DIAMETER (INCHES)	LENGTH (INCHES)	LOAD (LBS)	AREA (SQ. INCHES)	UNIT LOAD (PSI)
CB-JHPM09-2	5.2-6.0'	-46.6	1	3.950	8.055	1750	12.57	140
CB-JHPM09-2	10.6-11.3'	-52.0	2	3.950	8.025	72000	12.57	5728
CB-JHPM09-5	15.8-16.5'	-59.2	1	3.950	8.000	3850	12.57	306
CB-JHPM09-6	4.0-4.5'	-49.0	1	3.950	6.565	5000	12.57	398
CB-JHPM09-7	3.0-3.8'	-47.8	1	3.950	8.075	30600	12.57	2435
CB-JHPM09-7	5.3-6.0'	-50.1	1	3.975	7.925	11750	12.57	935
CB-JHPM09-9	15.8-16.5'	-58.8	1	3.957	8.000	4250	12.57	340
CB-JHPM09-11	9.5-10.2'	-54.6	1	3.975	8.000	10250	12.57	815
CB-JHPM09-16	5.5-6.2'	-48.4	1	3.950	8.175	15100	12.57	1201
CB-JHPM09-16	6.8-7.2'	-49.7	1	3.975	4.750	1700	12.57	135
CB-JHPM09-17	2.0-2.7'	-46.4	1	3.940	8.125	5200	12.57	414
CB-JHPM09-18	1.8-2.5'	-45.9	1	3.950	8.150	5100	12.57	406
CB-JHPM09-35	5.0-5.7'	-50.7	2	3.975	7.650	19500	12.57	1551
CB-JHPM09-39	7.7-8.2'	-50.1	1	3.975	8.050	8350	12.57	664
CB-JHPM09-40	11.8-12.5'	-58.5	1	3.900	7.950	750	12.57	60
CB-JHPM09-42	7.2-7.9'	-47.0	1	3.950	8.025	24500	12.57	1949
CB-JHPM09-42	15.7-16.3'	-55.5	3	3.980	7.000	6500	12.57	517
CB-JNPM09-45	16.7-17.4'	-59.5	2	3.950	8.100	2500	12.57	199
CB-JHPM09-45	17.4-17.9'	-60.2	2	3.975	5.850	2000	12.57	159

NOTE: 1. TESTS WERE PERFORMED ON EACH DESIGNATED ROCK CORE IN A CALIBRATED RIEHLE
UNIVERSAL TEST MACHINE IN THE 0-150,000 RANGE AT A UNIFORM LOAD RATE BETWEEN 2-7 MINUTES PER CORE.

2. PHOTOGRAPHS WERE TAKEN OF EACH CORE PRIOR TO AND FOLLOWING THE APPLICATION OF LOADING WHEN THE
ULTIMATE COMPRESSIVE STRENGTH WAS ACHIEVED AND FAILURE OCCURRED.

GRR2 DEEPENING STUDY – JETTY SLOPE STABILITY ANALYSIS MFR

EN-GS

1 March, 2013

S. Meyer

Purpose. To analyze the stability of the North and South Jetty both in their current condition and with the proposed harbor deepening.

Geotechnical Investigation. The geotechnical investigations and the geologic conditions encountered within the scope of study are presented as an attachment to this MFR. The Attachment includes core boring locations and associated representative data. Additional Investigations will be required to enhance the existing data to bring it to Plans and Specification standards.

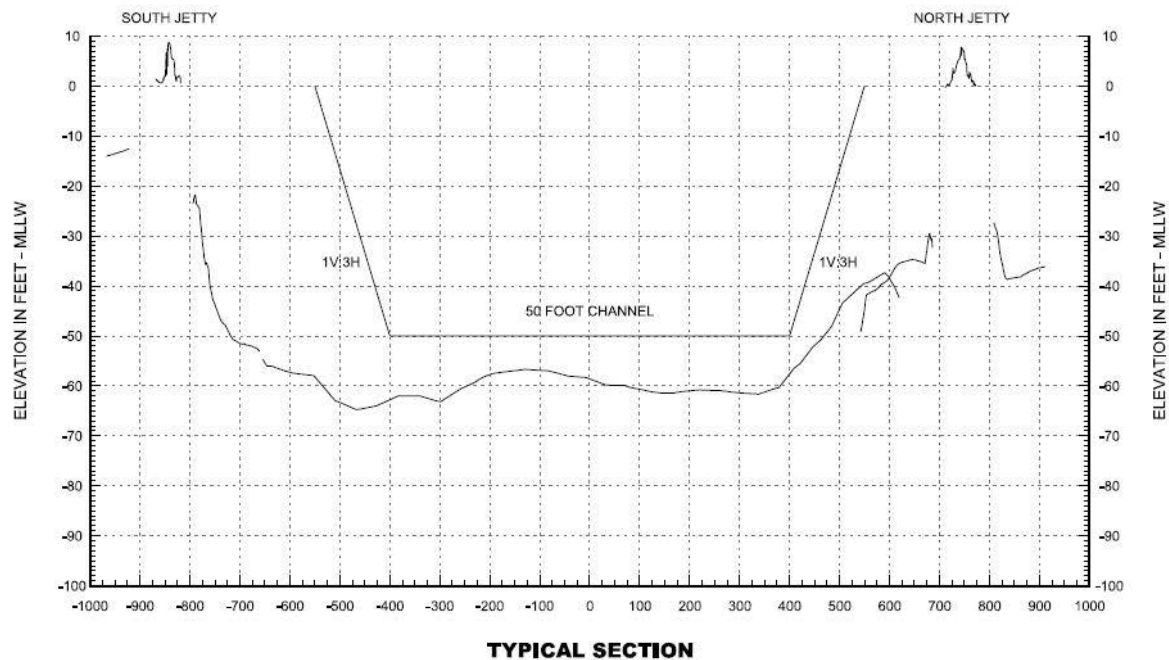
Engineering Analysis and Assumptions. This analysis evaluated the cross sections provided by EN-DW within the Jacksonville Harbor Bar Cut 3.



Figure 1. Approach Channel and Jacksonville Harbor Bar Cut 3.

Slope stability analyses were performed using SLOPE/W within the GeoStudio 2012 (Version 8.0) suite of software to determine the stability of the existing and proposed channel slopes in the vicinity of the North and South Jetty. The most critical (i.e., steepest slopes, most required slope cut) slope scenarios were analyzed. Engineering Manual (EM) 1110-2-1902 "Slope Stability" (dated 2003) was the guidance used. Slope geometry was based on information provided by a series of composite surveys performed between 2003 and 2012. It should be noted that several gaps in the survey data exist and some assumptions had to be made in geometry in order to perform the analyses. In addition, since the exact foundation elevations for both the north and south jetties are unknown, they were conservatively assumed to be at elevation -20.0 ft MLLW. Figure 2 shows an example cross section showing the survey gaps data.

**JACKSONVILLE HARBOR GRR2
CROSS SECTIONS FOR JETTY STABILITY
(STA 160+00 TO STA 236+00)**



NOTES:
 1. SURVEY DATA OF JETTIES IS A COMBINATION OF MULTIBEAM AND LIDAR FROM SEPTEMBER 2010 (10-177).
 2. SURVEY DATA OF CHANNEL WAS PROVIDED BY SRC AND IS COMPILED OF DEEPEST DEPTHS ACHIEVED.
 3. CHANNEL WIDTH REDUCES FROM 800 FEET TO 760 FEET WESTWARD OF STATION 198+63.

Figure 2. Typical Cross Section.

It should also be noted that boring information along the jetties is sparse, with borings being spaced more than 1,000 feet from some areas of interest and there are no lab samples associated with the samples. This led to several conservative assumptions about the subsurface conditions at the jetty locations. Therefore, as noted above, it is recommended that additional subsurface information be gathered at the most critical areas for the design phase of this project, as well as, the acquisition of more detailed as-built and survey information of the jetties.

Existing Jetty Stability. The results of the slope stability analyses indicate that the most critical area was the South Jetty, near Station 180+00, for which the surveys showed an existing side slope steeper than one foot vertical to one and a half feet horizontal (1V:1.5H). Figure 3 below shows the proposed channel cross section over the provided survey data.

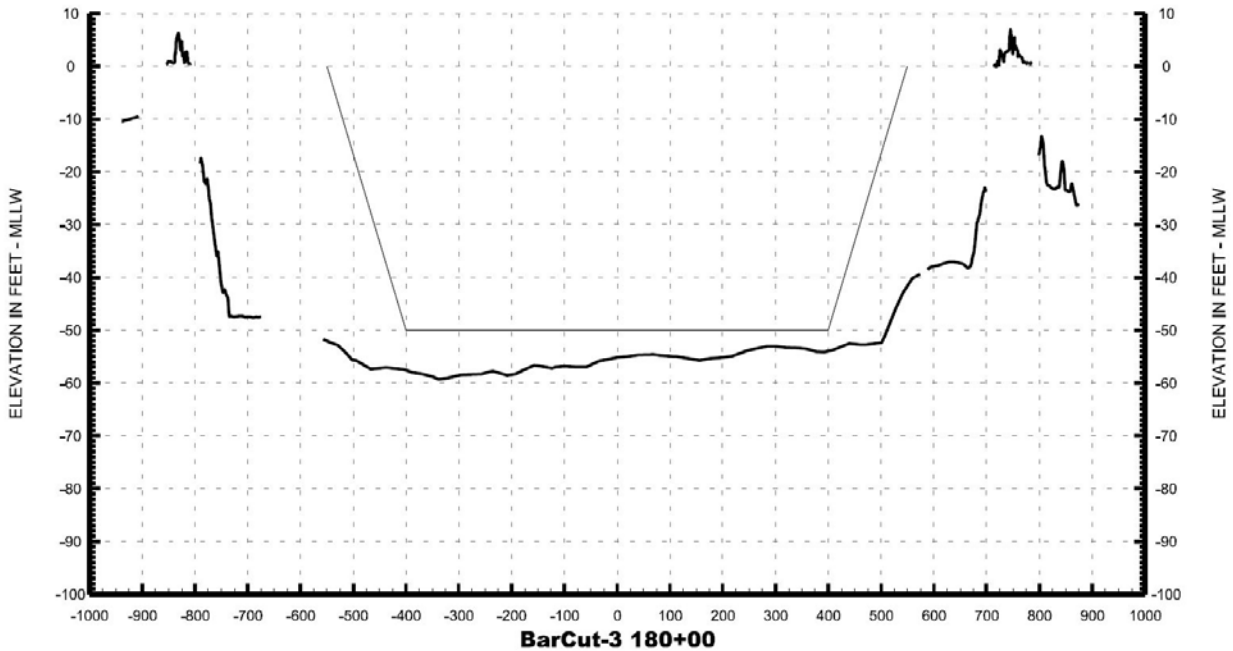


Figure 3. Station 180+00. Left side of the cross section represents the South Jetty.

Subsurface information used to estimate soil parameters was based on Boring CB-MPJ08-1, performed near the south side of the jetties near Station 198+00, and was the closest boring performed to the critical area. The soil parameters shown in Table 1 below were assumed based on the boring showing that the soils are fairly consistent with loose to medium dense sand throughout the encountered profile.

Table 1. Assumed Soil Parameters – S Strengths (Steady-State)

	Unit Weight, pcf	Cohesion, psf	Phi
Jetty Stone	145	0	45
Sands (SP, SM, SC)	110	0	30

Figure 4 below shows the results of the analysis. The South Jetty in its current state has an inadequate factor of safety of 1.11.

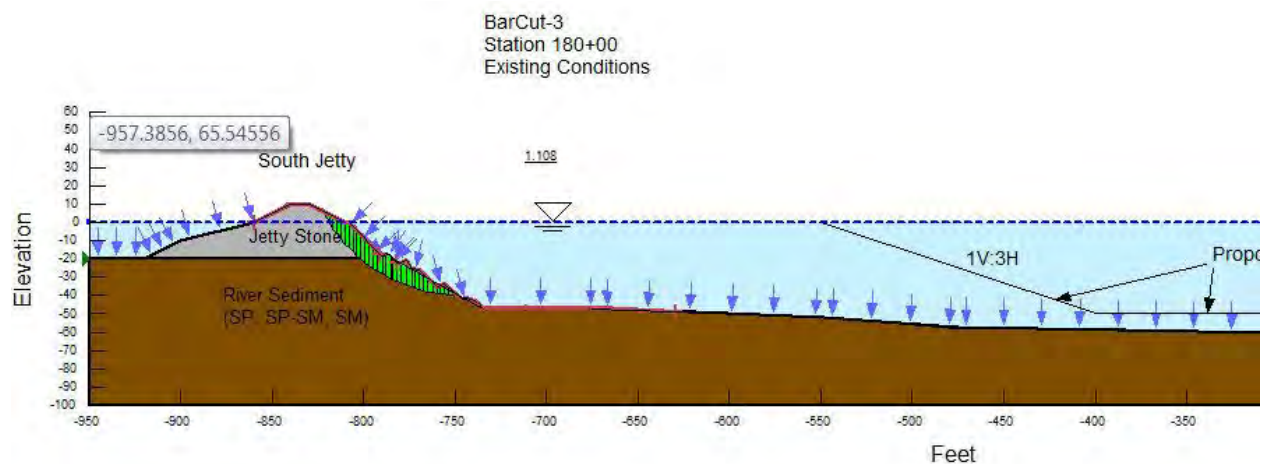


Figure 4. Existing Condition Results, FOS 1.11

The same surveys indicate there are several more areas for both the South and North Jetty where slopes are approaching 1V:1.5H. It should be noted that none of these areas will be impacted by the proposed harbor deepening, since they are in areas where the existing channel is both wide and deep enough that no dredging will be required. Also, design of jetty stabilization features was not performed as part of this study, as this is outside the scope of this project.

Jetty Stability with Recommended Plan. A slope stability analysis was performed to determine if the proposed dredge design template would impact the stability of the existing jetties located to the north and south of the proposed project. The most critical area was determined to be the North Jetty, near Station 213+00, for which surveys indicated that approximately 50 to 75 feet of horizontal cut of the existing slope will occur and the adjacent river bottom deepened by approximately 2 feet by the proposed dredging. In addition, by visual inspection it appears that this channel side slope is the steepest of the slopes that will be affected by the proposed deepening. Figure 5 below shows the proposed channel cross section over the provided survey data.

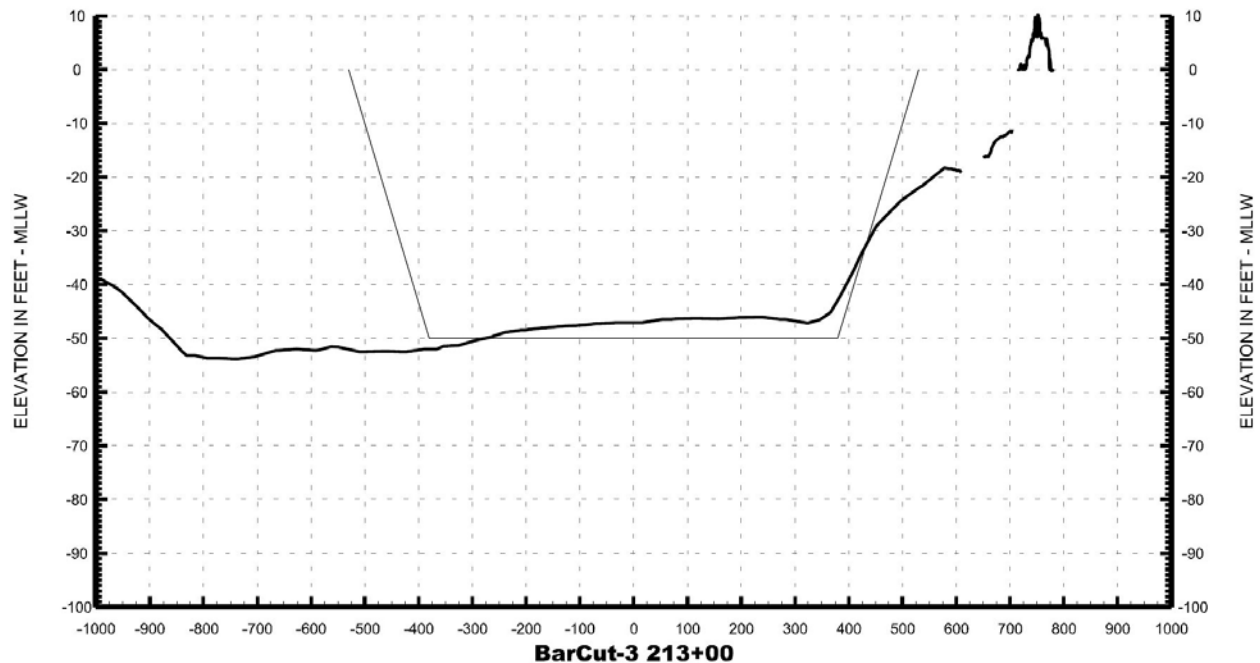


Figure 5. Station 213+00. Right side of the cross section represents the North Jetty.

Subsurface information used to estimate soil parameters was based on Boring CB-MPJ08-12, performed near the north side of the jetties near Station 213+00, and was the closest boring performed to the critical area. The soil parameters shown in Table 2 (end of construction) and Table 3 (Steady-State) below were assumed based on the boring showing multiple varying layers of sand, silt, and clay.

Table 2. Assumed Soil Parameters – Q Strengths (end of construction)

	Unit Weight, pcf	Cohesion, psf	Phi
Jetty Stone, EL 10 to -20	145	0	45
Sands/Shells, EL -20 to -35	120	0	34
Clay (CH), EL -35 to -40	120	1,000	0
Sand (SP), EL -40 to -44	125	0	36
Clay (CH), EL -44 to -46	120	1,250	0
Sands/Shells, EL -46 to -50	110	0	30
Silt (ML), EL -50 to -52	100	225	0
Sands/Shells, EL -52 to -61	115	0	32
Sand (SP-SM), EL -61 to -64	110	0	30
Silt (ML), EL -64 to 67	110	400	0
Sand/Silt Mix, EL -67 to -71	115	0	31
Silt/Clay (ML, CH), EL -71 to -76	120	1,000	0
Sands (SP, SM), EL -76 to -81	115	0	31
Sands (SP, SP-SM), EL -81 to -100	125	0	33

Table 3. Assumed Soil Parameters – S Strengths (Steady-State)

	Unit Weight, pcf	Cohesion, psf	Phi
Jetty Stone, EL 10 to -20	145	0	45
Sands/Shells, EL -20 to -35	120	0	34
Clay (CH), EL -35 to -40	120	0	23
Sand (SP), EL -40 to -44	125	0	36
Clay (CH), EL -44 to -46	120	0	23
Sands/Shells, EL -46 to -50	110	0	30
Silt (ML), EL -50 to -52	100	0	18
Sands/Shells, EL -52 to -61	115	0	32
Sand (SP-SM), EL -61 to -64	110	0	30
Silt (ML), EL -64 to 67	110	0	19
Sand/Silt Mix, EL -67 to -71	115	0	31
Silt/Clay (ML, CH), EL -71 to -76	120	0	26
Sands (SP, SM), EL -76 to -81	115	0	31
Sands (SP, SP-SM), EL -81 to -100	125	0	33

For the end of construction two different failure modes were evaluated, a circular failure surface near the dredge cut location and also a block failure through an identified weak silt layer between elevation -48 and -50 MLLW. The controlling failure surface in this case was determined to be the block failure with a factor of safety of 1.33, which meets the requirements for minimum factor of safety for this project. Figure 6 and 7 below show the circular failure and block failure results, respectively.

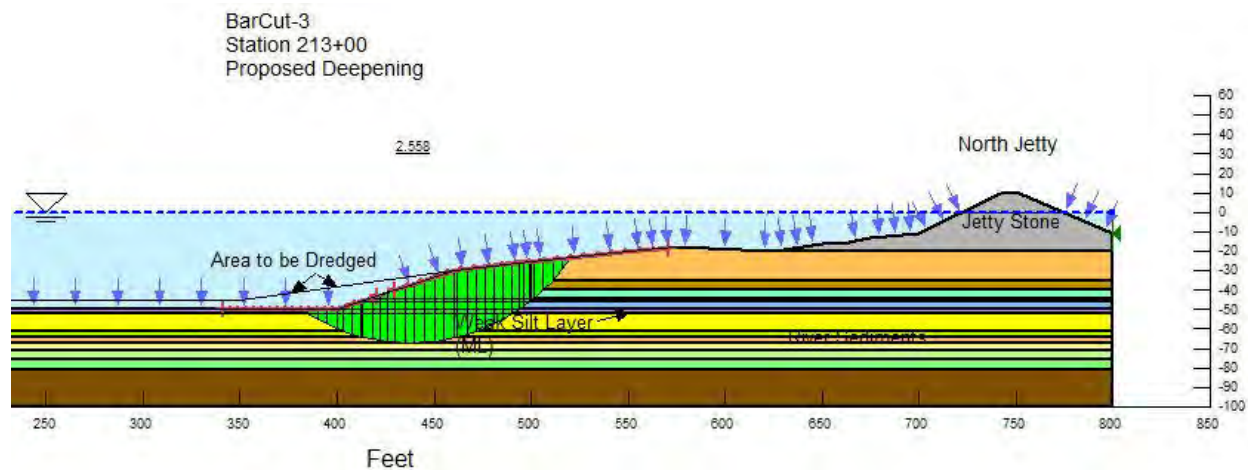


Figure 6. Circular Failure with Q Strengths, FOS 2.56

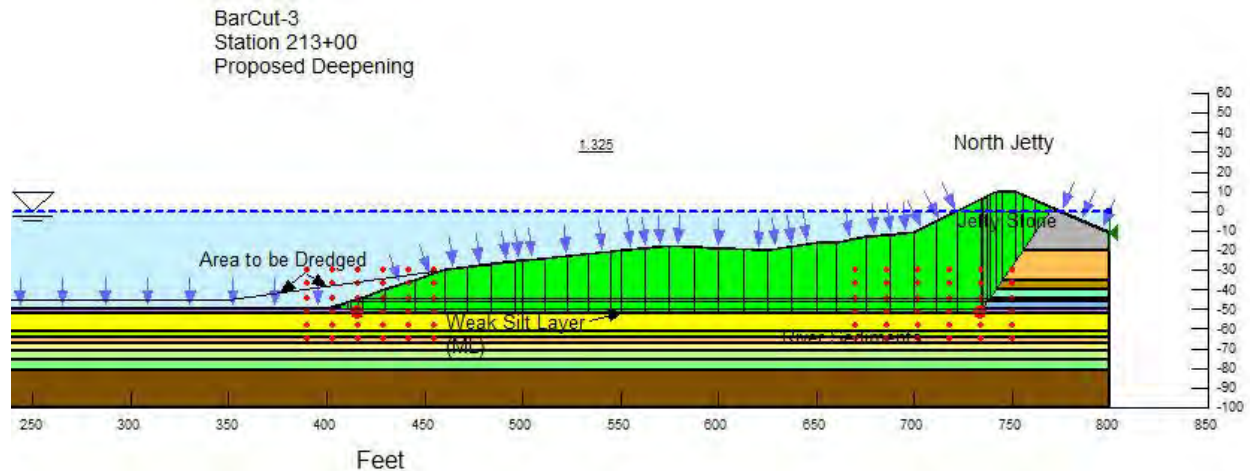


Figure 7. Block Failure through Weak Silt, Q Strengths, FOS 1.33

For the long term steady-state condition two different failure modes were evaluated, a circular failure surface near the dredge cut location and also a block failure of the jetty stone. The controlling failure surface in this case was determined to be the circular failure near the dredge cut with a factor of safety of 1.48, which meets the requirements for minimum factor of safety for this project. Figures 8 and 9 below show the different failure mode results.

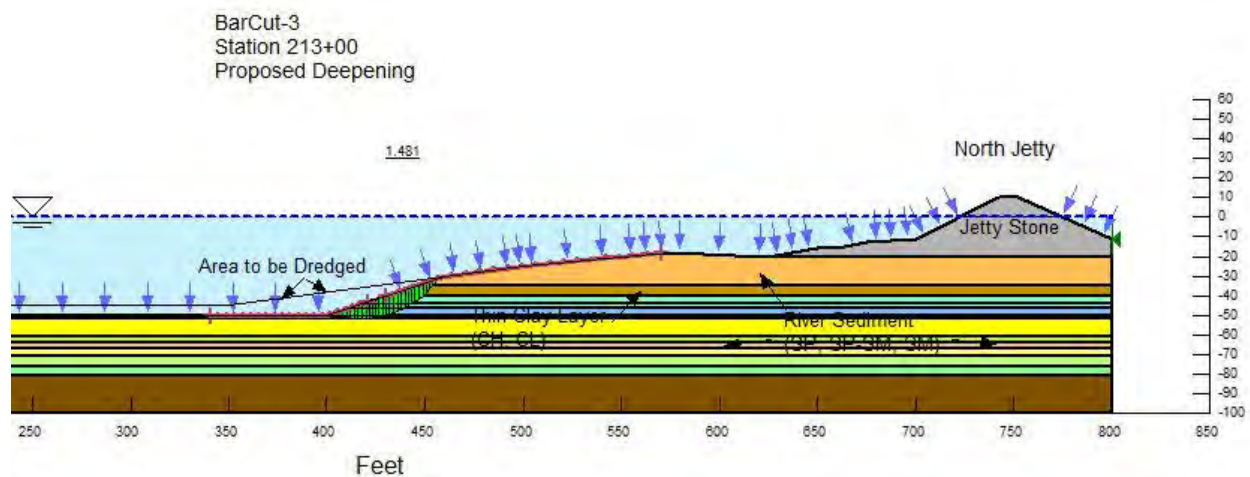


Figure 8. Circular Failure at the Dredge Cut, S Strengths, FOS 1.48

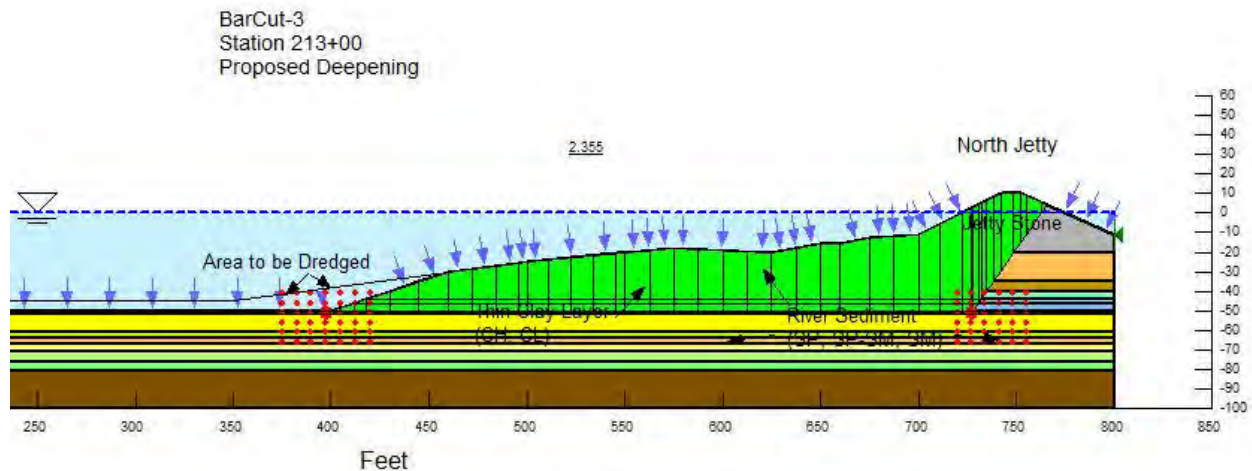


Figure 11. Block Failure at the Jetty Stone, S Strengths, FOS 2.36

Conclusion. Based on the results of these analyses the existing jetties are, at least at some locations, marginally stable with factors of safety that are below what is acceptable based on EM 1110-2-1902. However, these areas will not be affected by the proposed deepening since they are in areas where the existing channel is both wide and deep enough that dredging will not be required.

The proposed deepening will require dredging in some areas of the channel to widen and deepen the existing channel. Based on the results of these analyses the areas affected will have adequate factors of safety against slope stability as described in the EM.

Again, it should be noted that there are several gaps in the survey data and limited subsurface information. Additional investigations and analyses will be required to bring these analyses to Plans and Specifications standards.